

# MARINE REVIEW

Entered at Cleveland Post Office as Second-class Mail Matter.

VOL. XXV.

Published every Thursday at  
39-41 Wade Bldg., by the  
Marine Review Pub. Co.

CLEVELAND, O., JUNE 5, 1902.

Subscription \$3.00 a year.  
Foreign \$4.50 a year.  
Single Copy 10 cents.

No. 23

## ELEVEN MONTHS' SHIP BUILDING.

The bureau of navigation, treasury department, reports 1,198 sail and steam vessels of 363,638 gross tons built in the United States and officially numbered during eleven months ended May 31, as follows:

	WOOD.				STEEL.				TOTAL.	
	SAIL.		STEAM.		SAIL.		STEAM.		No.	Gross tons.
	No.	Gross tons.	No.	Gross tons.	No.	Gross tons.	No.	Gross tons.		
Atlantic and gulf .....	526	59,332	244	16,766	7	9,184	54	74,285	831	159,567
Porto Rico .....	2	34							2	34
Pacific .....	43	24,756	77	9,245			2	10,707	122	44,708
Hawaii .....			1	13					1	13
Great lakes .....	6	161	55	3,013			47	148,435	108	151,609
Western rivers .....	6	114	123	7,392			5	201	134	7,707
Total .....	583	84,397	500	36,429	7	9,184	108	233,628	1198	363,638

During the corresponding eleven months, ended May 31, 1901, 1,024 sail and steam vessels of 359,789 gross tons were built in the United States and officially numbered, as follows:

	WOOD.				STEEL.				TOTAL.	
	SAIL.		STEAM.		SAIL.		STEAM.		No.	Gross tons.
	No.	Gross tons.	No.	Gross tons.	No.	Gross tons.	No.	Gross tons.		
Atlantic and gulf .....	414	69,001	175	10,314	9	10,320	42	80,250	640	169,885
Porto Rico .....										
Pacific .....	50	23,991	79	10,044			6	7,607	135	41,642
Hawaii .....										
Great lakes .....	6	116	40	4,824	5	11,236	42	121,757	93	137,933
Western rivers .....	57	1,054	98	8,713			1	562	156	10,329
Total .....	527	94,162	392	33,895	14	21,556	91	210,176	1024	359,789

In the month of May this year the number of vessels built and officially numbered was 126 and their tonnage 34,139. Fourteen of these vessels, aggregating 22,899 (or about 67 per cent. of the whole) were from ship yards of the great lakes.

## COST OF BATTLESHIPS.

Rear Admiral F. T. Bowles, chief constructor of the United States navy, sent a letter to the naval committee of the house of representatives recently giving the cost of the various battleships. In the letter he said:

"I inclose a table of cost of battleships, based upon the contract weight, exclusive of armor and armament—that is, the cost per ton is the cost per ton of weight contracted for in the hull, machinery and fittings. Down to the Wisconsin in this table the figures are the actual returned cost—that is, including the contract price and extras. From the Maine to the Pennsylvania it is the contract price alone, and the amounts will probably show, when completed, from \$20 to \$30 more per ton. It is true that the Kearsarge and Kentucky were built at probably less than cost, and the price, \$385 per ton, certainly involves no profit. The first battleships, Oregon, Massachusetts and Indiana, must have brought a considerable profit to the builders, but since their time the profits have not been unreasonable, and this table clearly shows the advantages of competition."

The table submitted by Rear Admiral Bowles to the committee is as follows:

### COST OF BATTLESHIPS.

	Contract weight, tons.	Cost of hull and machinery, trial and extras.	Cost per ton.	Contract year.
Oregon .....	5,691.10	\$3,736,180.67	*\$656	1890
Massachusetts .....	5,691.10	3,333,570.33	*586	1890
Indiana .....	5,691.10	3,261,657.22	*573	1890
Iowa .....	6,492.90	3,235,614.71	*498	1893
Kearsarge .....	6,339.21	2,441,616.49	*385	1896
Kentucky .....	6,339.21	2,442,232.62	*385	1896
Illinois .....	6,391.72	2,651,023.33	*415	1896
Alabama .....	6,391.72	2,755,206.59	*431	1896
Wisconsin .....	6,391.72	2,787,696.65	*436	1896
Maine .....	7,184.91	2,885,000.00	†401	1898
Missouri .....	7,184.91	2,885,000.00	†401	1898
Ohio .....	7,184.91	2,899,000.00	†403	1898
Virginia .....	8,874.00	3,590,000.00	†405	1901
Pennsylvania .....	9,571.00	3,890,000.00	†406	1901

\*Actual returned cost.

†Contract price.

Secretary Moody of the navy department has laid before the president and his cabinet plans for the grandest set of naval maneuvers ever undertaken by the United States government to be held next winter. The plans have been approved and will be put into execution as soon as the general board has worked out the details. They are expected to prove of the greatest value in maintaining the steady development which the United States navy has undergone since the beginning of the Spanish war. The central project is the assembling of three great squadrons or fleets—the North Atlantic, the South Atlantic and European squadron—at or near Culebra island on the east coast of Porto Rico, about Dec. 15 next. The fleets will work out two or three problems prepared by the general board, under Secretary Moody's direction.

## IRON ORE SHIPMENTS—LAKE FREIGHTS.

Reports from all iron ore shipping docks in the upper lake region show an output to June 1 of 5,148,137 tons gross, which is 3,558,362 tons in excess of the output on the same date a year ago. It was expected that the movement of ore in May would be close to 4,000,000 tons, but the reports show shipments of only 3,293,235 tons. This is discouraging enough, however, from the vessel owner's standpoint, as the shipments in May last year aggregated only 1,589,775 tons, and as noted above, the entire output to June 1 is full three and a half millions ahead of last year. Still the ship owners are finding some encouragement in the expectation that ore will be moved throughout the season in volume fully up to the limit of dock and railway capacity. There seems to be no end to the demand for finished product in iron and steel lines. Even within the past week large quantities of pig iron have been sold for delivery during the first quarter of next year and for some of this iron \$21 a ton is to be paid. It is understood that the Steel Corporation is prepared to buy 100,000 tons for delivery in the second quarter of 1903 and that this purchase would have been made this week but for the strike in the Mahoning and Shenango furnace districts. It is also quite true that lake coal shippers have not in some cases moved half the coal they expected to move up to this time, and in this condition the vessel owners also find some encouragement, notwithstanding that there is clearly a surplus of carrying capacity if the vessels could be kept moving. A strange feature of the situation is the prices asked for new vessels. Numerous berths in the lake yards will soon be idle, and it was expected that the builders would be offering inducements on orders for next spring's delivery, but the prices they are quoting on ships of 5,000 to 6,000 tons capacity are \$7,000 to \$10,000 above the prices charged for vessels of the same kind that have lately been going into commission. High prices for material and uncertainty as to delivery are referred to as causes for the increased prices on new ships.

## DATA OF LATE TRANSATLANTIC STEAMERS.

Steamers.	Campania.	Kaiser Wilhelm der Grosse.	Oceanic.	Deutschland.	Kronprinz Wilhelm.	Savoie.
Built in .....	1893	1898	1899	1900	1901	1901
Length, feet .....	622.4	622.4	705.4	684	663.3	582.3
Breadth, feet .....	65.3	65.9	67.9	66.9	65.9	60
Depth, feet .....	44.6	42.9	49.2	43.9	42.9	39.3
Draught, feet .....		27.8	32.4	28.8	27.8	25.4
Displacement, tons .....	18,000	20,900	28,500	23,200	21,300	15,400
L. H. P. .....	29,600	27,610	24,060	35,500	32,550	21,700
Speed, knots .....	22	22.75	26	23.50	23.20	20.50
Officers and Men .....	415	450	394	543	522	383
Passengers .....	1,700	1,580	1,710	1,283	1,650	1,075
Type of Engines .....	Trip. exp.	Trip. exp.	Trip. exp.	Quad. exp.	Quad. exp.	Trip. exp.
No. and Diam. cyls. .....						
H.P., inches .....	2 × 37	51.96	47.47	2 × 36.61	2 × 34.25	44.49
1st I.P., inches .....	80.38	89.76	74.09	73.62	68.8	68.50
2d I.P., inches .....	80.38	89.76	74.09	103.93	98.42	68.50
L.P., inches .....	2 × 98	2 × 96.45	2 × 92.98	2 × 106.30	2 × 102.36	2 × 80.31
Stroke, inches .....	69	68.89	72.04	72.83	70.86	66.93
Ratios of Cylinders .....	1-2-36-7	1-3-6-9	1-2-43-7-7	1-2-4-8-4	1-2-415-8-9	1-2-37-6-52
Boiler Pressure, lbs. .....	167	177	192	213	213	170
Rev. per Minute .....	79.5	77 to 78		77 to 78	80 to 82	84
No. of Boilers .....	12D, 1S	12D, 2S	15D	12D, 4S	12D, 4S	16S
Furnaces .....	100	104	96	112	112	64
Grate Surface, sq. ft. .....	2,627	2,594	1,938	2,196	2,702	1,227
Heating Surf. sq. ft. .....	82,100	84,400	74,060	85,580	93,660	45,550
Cooling Surf. sq. ft. .....	82,100	35,550	74,060	43,060	41,210	32,530
Propellers, diam. ft. .....	23.48	22.3	20.25	22.3	21.82	21.32
Pitch, feet .....	30.5	32.8		32.8	32.8	25.56
Nature of Draft .....	Assisted.	Assisted.	Assisted.	Forced.	Assisted.	Forced.

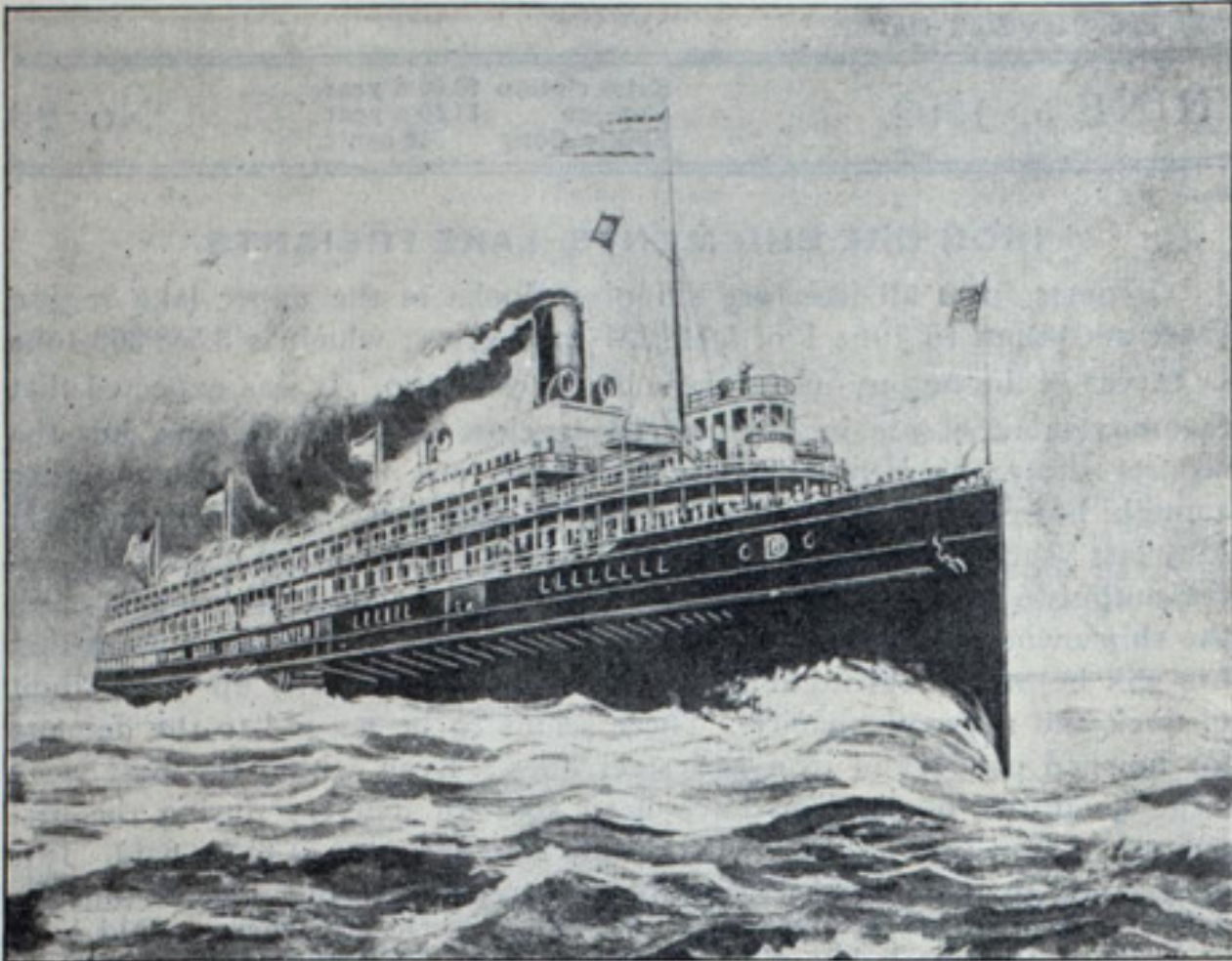
The status of appropriation bills seems to indicate decided progress towards adjournment of congress. Seven of these measures have been approved by the president, and it is expected that another, the river and harbor bill, in which vessel men are especially interested, will go to the chief executive this week. The conference report on this bill has been adopted by the house and no opposition to it is looked for in the senate. The sundry civil bill, another measure that carries appropriations of interest to shipping—funds for river and harbor improvements of continuous contract kind, for aids to navigation, etc.—is in conference, but a report from the conferees is not expected for a couple of weeks.

The International Steamship Co., in which Mr. A. B. Wolvin of Duluth was the leading spirit, and which built on the lakes a short time ago the steamers Asuncion and Paraguay and the barges Loyalty and Liberty, has finally sold all four of its vessels. The Paraguay was sold some time ago to the Sun Oil Co. of Pittsburgh and the Loyalty and Liberty to the Standard Oil Co. All were converted into oil tankers. Now the Asuncion, which is on the Pacific coast, has been sold to the Standard, and will also be fitted for carrying oil. The vessels were all of Welland canal dimensions.

Shareholders of the Cunard Steamship Co. have received from the directors a circular announcing that negotiations are on foot which affect the future position of the company, but adding that it is impossible to make a more definite announcement until the proposals in question have been submitted to the British government. It is said that this announcement has no connection with the Morgan steamship combination and the inference is that another combination with the Cunard line as a nucleus is on foot.



## FOR DETROIT-BUFFALO STEAMBOAT SERVICE.



NEW SIDE-WHEEL PASSENGER STEAMER EASTERN STATES.

Steamboat service between Detroit and Buffalo was inaugurated this week with the initial trip of the steamer Eastern States, which will be joined in a few weeks by a sister ship, the Western States. These vessels, just completed by the Detroit Ship Building Co., are the largest and finest side-wheelers on the lakes.

## SHIP BUILDING AT PHILADELPHIA AND VICINITY.

Philadelphia, June 4.—At the annual stockholders' meeting of the William Cramp & Sons Ship & Engine Building Co. it was announced that to meet the bankers' expressed wish it had been determined to issue \$5,500,000 first mortgage, thirty-year, 5 per cent. gold bonds, instead of \$4,000,000 bonds as first intended. Of the new bonds \$1,500,000 will be used to retire the existing bonds. With the proceeds of the other \$4,000,000 it is intended to pay off \$400,000 due on purchase of land upon which the new machine shop stands, leaving about \$3,600,000 for working capital. A special stockholders' meeting will be called to authorize the bond issue. The purpose is to provide for the extensions of the plant and additional working capital made necessary by the largely increasing business of the ship yard. Arrangements have been made by Morton McMichael, vice-president of the First National Bank, and an active director of the Cramp company, for the underwriting of the bonds here and in New York. The annual report for the year ended April 30, last, shows gross earnings of \$8,202,093, an increase of \$883,093 over 1901. Contracts on hand May 1 aggregated \$24,730,874, upon which \$11,919,415 had been collected, leaving a balance receivable of \$12,811,456. The old board of directors was re-elected. There are now employed by the Cramps over 7,000 men, while unfinished contracts aggregating nearly \$20,000,000 are in hand. It is understood that enough work is in sight to insure employment for 7,000 to 7,500 hands for three years to come.

The prosperity of the Cramp company is of much interest to the city of Philadelphia at large. Although there is at present the minimum of idleness among the trades it is a source of satisfaction to the residents of Kensington and Richmond that no matter how serious a crisis may materialize in the future it will not be reflected in this busy plant. Wages have been adjusted throughout all departments of the works to the satisfaction of the employees and are at a higher average rate than ever before paid in this city. The general trend of the contemplated improvements to the property, which as yet are in embryo, are still sufficient to indicate that the company will feature the construction of warships. In this line alone there is enough work at the yard to keep the entire force fully occupied, exclusive of the merchant ships under way. The delivery of armor plate for the cruiser Pennsylvania will begin this week and officials of the company have been advised that it will continue with regularity until the last piece is at the ship yard. This will enable the Pennsylvania to make a large gain in percentage of completion before the end of the year. The vessel will be launched within three months. The Colorado, sister ship to the Pennsylvania, is proceeding rapidly, although somewhat behind the Pennsylvania. The ships are building side by side and are supplied with material by the same traveling crane. The Maine will proceed on her builders' trial some time in July. A force of 1,500 men is constantly engaged on this battleship and she is rapidly nearing completion.

Positive assurance was given by President Roosevelt and Secretary of War Root to the committee of the Maritime Exchange which visited Washington that the Delaware river channel from this port to the Delaware bay would be deepened to 30 ft. within two years and that the work would be done under the direction of an engineer stationed in this city. The president and Secretary Root both promised that the work on the channel would be resumed at once at Dan Baker shoal. The Philadelphia Maritime Exchange having felt dissatisfied for some time with the absence of substantial progress in the work of deepening the Delaware river channel to the sea, notwithstanding the existence of an approved project therefor by the United States engineers and a liberal appropriation by congress, decided that direct action by them was imperative.

A duplicate of the handsome tug John A. Hughes, recently launched, is now under construction in Dialogue's ship yard, Camden, for southern parties. The new tug will be 100 ft. long, 20.6 ft. wide and 12.3 ft. deep. She will have steel hull and houses, and will be supplied with compound fore-and-aft, surface-condensing engines and wrecking apparatus. The vessel is well under way and will soon be ready for launching.

Navigators charts, all kinds, are sold by the Marine Review.

## OUR COMMANDING POSITION IN IRON AND STEEL MAKING.

The commanding position of the United States in the production and manufacture of iron and steel is illustrated by some figures published in the London Commercial Intelligence, a copy of which has just reached the treasury bureau of statistics. The world's total product of pig iron in 1901, it says, amounted to 40,408,000 tons, of which the United States contributed 15,878,000 tons, the United Kingdom 7,750,000 tons, Germany 7,663,000 tons, Russia 3,100,000 tons, France 2,362,000 tons, and the remainder of the world 3,655,000 tons. Comparing the product of 1901 with that of the annual average for the five-year period 1866-70, it will be seen that the United States has increased its iron and steel output far more rapidly than any other nation, the figures being: United States from 1,464,000 tons to 15,878,000 tons, an increase of 985 per cent.; United Kingdom from 5,133,000 tons to 7,750,000 tons, an increase of 51 per cent.; Germany from 1,226,000 tons to 7,663,000 tons, an increase of 525 per cent.; and the entire world, exclusive of the countries mentioned, from 2,710,000 tons to 9,117,000 tons, an increase of 236 per cent. An even more noticeable feature of this growth, pointed out by the authority from which these figures are quoted, is the steady and enormous growth of the proportion of the world's product supplied by the United States and the equally rapid decadence in the position held by Great Britain. Thirty-five years ago the United Kingdom produced practically one-half of the world's pig iron, while the United States produced less than one-seventh of the total; whereas, in 1901, the United States stood first in its proportion of the total, contributing practically four-tenths as against less than two-tenths by the United Kingdom, and about the same share by Germany.

In the five-year period 1866-70, the world's per capita consumption of pig iron was 17 lbs.; in 1901, it was 57 lbs.; while in the latter year the United States consumed 455 lbs. per capita, and the United Kingdom 350 lbs. per capita. The effect of this remarkable increase in the production of iron in the United States has been strongly marked in its relation to our foreign commerce. Imports of iron and steel manufactures in 1882 amounted to \$67,976,897 and formed 9.3 per cent. of the total imports; in 1901 they had fallen to \$17,874,789 and formed but 2.2 per cent. of the total imports. On the other hand, our exports of iron and steel manufactures have grown during the same time from \$20,748,206 in 1882 to \$117,319,320 in 1901. They formed in 1882 about 3 per cent. of the total exports and 15 per cent. of the manufactures exported; while in 1901 they formed 8 per cent. of the total exports and 28 per cent. of the manufactures exported.

The following table shows the production of pig iron in the United States, United Kingdom, Germany, and all other countries at quinquennial periods from 1865 to 1901, stated in gross tons:

Year.	United States. Tons.	United Kingdom. Tons.	Germany. Tons.	All other countries. Tons.
1865 .....	831,770	4,819,300	759,700	2,839,300
1870 .....	1,665,179	5,963,515	1,369,139	2,902,200
1875 .....	2,023,733	6,365,462	1,997,317	3,509,736
1880 .....	3,835,191	7,749,233	2,685,909	3,201,248
1885 .....	4,044,526	7,415,469	3,629,158	4,439,221
1890 .....	9,202,703	7,904,214	4,584,835	5,737,993
1895 .....	9,446,308	7,703,459	5,379,041	6,375,800
1900 .....	13,789,242	8,959,691	8,385,885	9,265,200
1901 .....	*15,878,354	7,750,000	*7,736,663	9,042,200

\*Iron and steel association figures.

## FAVORS AN ENLARGED CANAL.

John V. Barnes, president of the New York Produce Exchange, in his report at the annual meeting of the exchange held lately, claimed that the decline in business on the exchange is the result of trade combinations. He holds that the remedy for the diversion of the export grain trade from New York is the enlargement of the Erie canal. He said:

"The port of New York has shared in the general growth of trade and commerce of the country and certain interests of the exchange have been benefited. The net registered tonnage entered and cleared from the port of New York increased more than 1,000,000 tons last year. Much tonnage, however, was carried at unprofitable rates. There has been a considerable increase in the export of wheat from the country and a slight increase at this port. Corn exports at New York for the last twelve months show a decrease of 33,000,000 bushels as compared with the previous twelve months. The farmer is prospering, but the produce merchant as a middleman is steadily being supplanted by large corporate interests dealing almost directly between the producer and consumer. A large petroleum trade once conducted on our floor has passed in this trade evolution, and the flour, provision, lard and oil trades are concentrating in a limited number of corporations, which is most noticeable in the export trade of these products. Even the grain trade is not free from the same tendency. I am convinced the remedy for the continued diversion from this port of the grain trade, as well as general commerce, is an enlarged canal from the lakes to the Hudson river."

A dispatch from Tacoma, Wash., says that by June of next year it is expected that the New York & Cuba Mail Steamship Co., commonly known as the Ward line, will be carrying freight from New York to Puget Sound in eighteen days. The intention is to complete a line of transportation from New York to the Pacific coast through the Isthmus of Tehuantepec, making a saving of 1,300 miles over the Panama route. Freight will be carried across the Isthmus of Tehuantepec by railway and from there to Puget Sound. J. J. Allen, the agent of the company, is now in Tacoma and thinks that freight can be brought to the coast in about the same time as across the continent and nearly 40 per cent. cheaper.

In answer to a letter regarding improvements at Quebec and the probability regarding the establishment of fast Atlantic steamship service from Canada, Mr. J. Israel Tarte, minister of public works, writes to the Review as follows: "The department of public works will advertise in a few days for an extension of the present harbor accommodation at Quebec, the work to be carried out having for its object the building of a wharf 470 ft. by 1,200 ft. The plans provide for a possible depth of 40 ft. at low tide. The government has under their consideration, at the present time, the fast Atlantic steamship service."



### ENJOINING THE STOCK CONVERSION PLAN.

C. H. Vennor & Co., as the owners of 500 shares of common stock of the United States Steel Corporation, and James Pollitz, owner of 100 shares, preferred, have brought an action in the supreme court of New Jersey, which was removed on Saturday last on the petition of the defendants to the United States circuit court, to enjoin the carrying out of the plan which the stockholders have approved for the issue of \$250,000,000 of bonds in part in exchange for \$200,000,000 shares of the preferred stock, and to prevent any lien being placed upon the property of the company to secure the proposed issue of bonds. J. P. Morgan & Co., who were to finance the plan, are made defendants. The plaintiffs say the corporation cannot issue these bonds except for money or in payment for property purchased or acquired by it in the transaction of its business and that the purpose of issuing bonds to take up preferred stock would be unlawful. The papers state that the company, which is incorporated in New Jersey, has an authorized capital of \$1,100,000,000, of which \$550,000,000 is preferred stock, paying 7 per cent. dividends, and the rest is common stock.

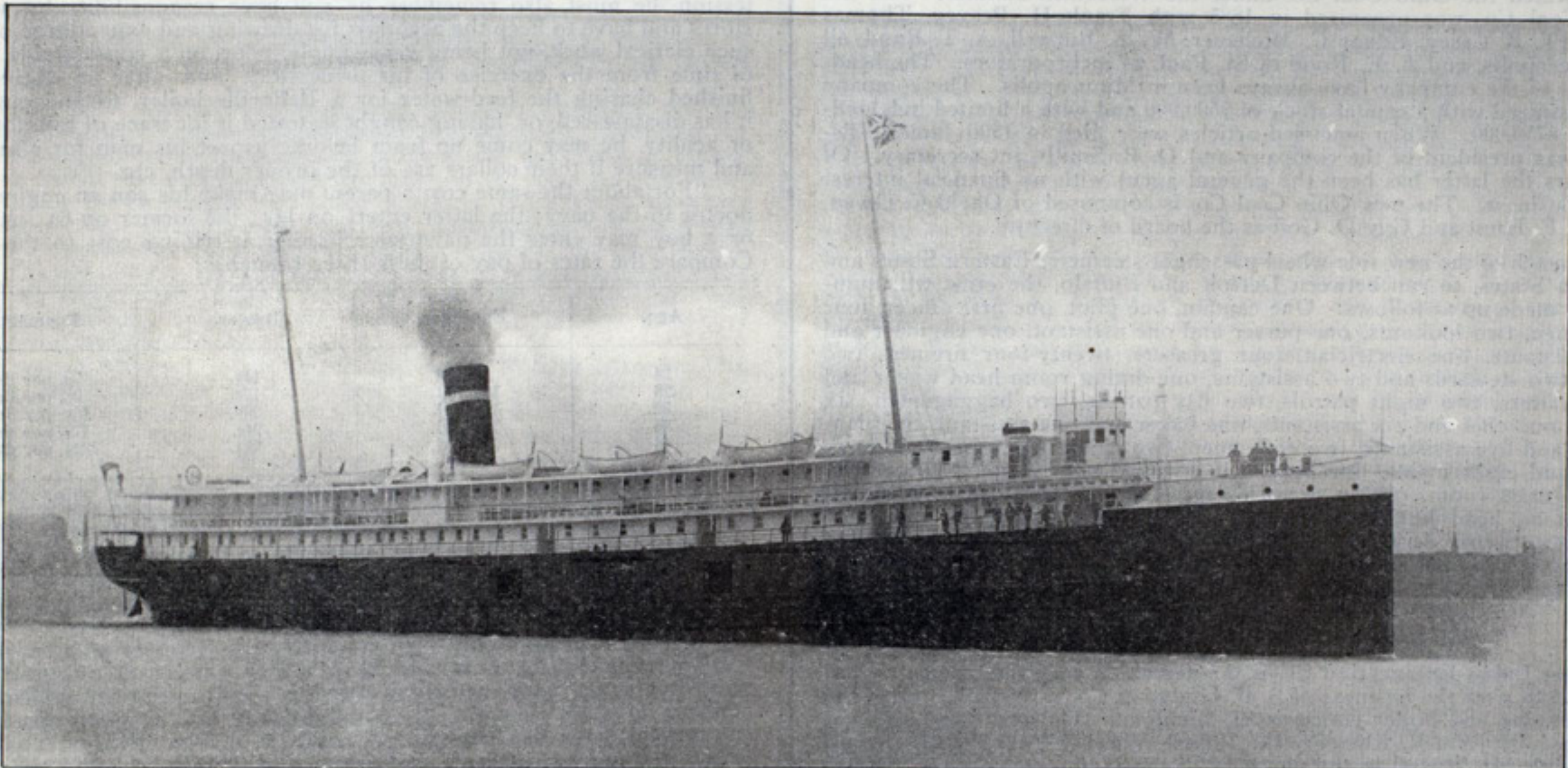
It is stated that the holders of preferred stock who may surrender their holdings to carry out the new plan will get greater security through the exchange for bonds, which would be unfair to other stockholders. The plan requires the raising of \$250,000,000 in bonds in all, but \$50,000,000 is to be employed for additional working capital. It is stated that the company has now a surplus of \$20,000,000 held as working capital. It is further averred that to carry out the plan 4 per cent. commission is to be paid, of which J. P. Morgan & Co. are to get \$2,000,000 and the other parties in the syndicate \$8,000,000. The plaintiffs further allege that the company can readily raise the \$50,000,000 for additional working capital without issuing bonds at 4 per cent. commission, and that the real scheme is to enable certain preferred stockholders to get a better security, more easy to be sold, and to create large profits in commissions. It is further averred that the act of the legislature of New Jersey passed on March 28 last on which the plan is based, is unconstitutional, as there is no limitation upon a corporation in the issuance of bonds. It is contended that the

annual saving of \$1,500,000, exceeding by \$490,000 the annual sinking fund contribution of \$1,010,000 required by the proposed mortgage. Now to me it seems that Mr. J. P. Morgan and Mr. Perkins fail to understand the difference between interest on a debt and a dividend on stock. The interest is a sum which the corporation is forced to pay out of its resources, although it may be working at a loss, and it is a fixed charge on the assets. The dividend is not a charge on the assets, it is only payable out of profits; it is the residue of the profits, which the corporation—having liberally supplied its own needs in the way of reserve funds, etc.—has no use for, and which it, therefore, distributes to its stockholders.

"Apply this distinction to the case in point. Supposing that, after paying the interest and sinking fund of Mr. Carnegie's first mortgage, there should be just \$14,000,000 on hand. Under the directors' scheme, before it could use a dollar for its own needs, the corporation would have to pay out \$13,510,000 as interest and sinking fund for the \$250,000,000 mortgage, and it would be left with the pittance of \$490,000 with which to make good its necessary reserves. But without the conversion scheme, the only forced payment out of the \$14,000,000 would be \$2,700,000, being the interest and sinking fund on the \$50,000,000 mortgage. It would therefore, be left with the handsome sum of \$11,300,000, instead of only \$490,000, and out of this it would be able to make good its reserves and supply all its corporate needs; having done that, it would distribute the residue, which it did not want itself, among its stockholders. As I see it, therefore, the proposed conversion scheme, instead of increasing the saving power of the corporation even by the trivial sum of \$490,000, would decrease it by \$10,810,000, being the difference between the \$13,510,000 fixed charges under the mortgage for \$250,000,000 and the \$2,700,000 fixed charges under the \$50,000,000 mortgage."

### STEEL CORPORATION'S PRICE POLICY FOR 1903.

It is reported from New York that the United States Steel Corporation will soon announce its price policy for 1903. Ordinarily a steel company is not expected to do this until late in the old year, but the corpora-



NORTHWESTERN TRANSPORTATION CO.'S NEW STEAMER HURONIC, FOR SARNIA-COLLINGWOOD SERVICE.  
Built by Collingwood Ship Building Co., Collingwood, Ont.

act impairs the obligations of the contracts made with the original stockholders. The constitutional question involved is the ground for transferring the case to the United States court.

John Trehane, the London lawyer and shareholder in the United States Steel Corporation, who prior to the meeting of the Steel Corporation's shareholders on May 19 to ratify the bond conversion plan, issued an open letter attacking the plan, has issued another letter, under date of London, May 24, which states that "an influentially-signed request for three months' delay was cabled on May 17 to the directors of the United States Steel Corporation from London," and comments that, despite objections, the plan was put through. Mr. Trehane's letter goes on to say:

"In this extraordinary affair the conundrum which puzzles me is this: Why, if the corporation is as prosperous as the directors say it is, are they in such an indecent haste to reduce their income from 7 per cent. to 5 per cent. and take a mortgage security? If the corporation is not as prosperous as they say it is, how dare they, being trustees, encumber the property, which they manage, with a mortgage in their own favor for \$200,000,000? Note how painful and embarrassing to sensitive men of honor will their position be if, through unavoidable misfortunes or their own reckless mismanagement, the corporation shall one day be unable to meet the new fixed charge of \$10,800,000 they are forcing upon it. They will then have to foreclose on themselves, and for their own protection they will have to cut out all the stock, both preferred and common. The circular of the directors contained a financial fallacy, which one would not expect from such experienced financiers as Mr. J. P. Morgan and his partner, the chairman of the finance committee. These gentlemen invited the stockholders to increase the mortgage debt of the corporation by \$200,000,000 without a dollar of direct consideration, because it would thereby gain the following advantage, and this, mark you, is the only inducement they can think of. They say, speaking of the \$250,000,000 mortgage:

"The consequent \$14,000,000 reduction of dividend payments, as compared with the \$12,500,000 increase of interest, would result in a net

tion finds nearly all of its plants booked for the maximum of their capacity for the remainder of this year and orders are pressing for delivery in 1903. A lot of business has already been booked for 1903 delivery on the present price basis, but most of these orders have been special and in some instances hedged about with qualifications. Some business has been accepted at current prices to be delivered either late this year or early next year at the convenience of the combine. Another kind of business for which the corporation has taken large orders running into 1903 is structural steel contract work, involving not only material but construction as well. The American Bridge Co. has in hand orders for bridge and office construction work which cannot possibly be finished in the current year. The pressure of orders is so great that the management has found it necessary to open its books for 1903 in the regular way, and hence the forthcoming announcement of a policy as to next year's prices. Structural forms and steel rails are the two products most in demand for 1903 delivery. It is current information that very large orders for steel rails to be delivered next year will soon be placed with the United States Steel Corporation. The expected announcement will cover practically all of the products of the corporation and the books will then be opened for 1903 orders for various grades of material in any quantity desired. It is understood that the price policy for 1903 will be very similar to that for the current year. It is believed, at least, that there will be no important changes in quotations.

Referring to the rumor, again sent out from Buffalo, that Capt. James Davidson of West Bay City, Mich., is planning upon the establishment of a ship yard for the construction of steel vessels on property adjacent to the Lackawanna Steel Co.'s new plant at South Buffalo, a Buffalo vessel owner says: "Capt. Davidson is interested in the property to which the Buffalo dispatches refer. His plans are along the line of a real estate deal, more so than any serious intention of starting a ship yard."



## AROUND THE GREAT LAKES.

It is expected that the first of the Northern Steamship Co.'s rebuilt passenger steamers will leave Buffalo on the 14th inst.

The new side-wheel steamer Eastern States is reported to have made the run from Buffalo to Detroit Tuesday (dock to dock) in 15 hours and 30 minutes.

Edward J. Kendall, well known as a marine reporter at Port Huron, died on Monday last in the City Hospital at Port Huron, after an operation.

It is expected that the steel freight steamer A. E. Stewart, building at West Bay City, will be launched about July 1. She will be immediately towed to the works of the Detroit Ship Building Co. for her engines and machinery.

The United States & Dominion Transit Co. (Booth line), H. H. Brigham, traffic manager, now operates the new steel steamers Argo and America out of Duluth, while the steamers Hiram R. Dixon and Hunter are in commission from Sault Ste. Marie. Another steamer is soon to be added to the line from Duluth.

Capt. B. F. Rounds, one of the oldest masters on the great lakes, is dead at Benton Harbor, Mich., at the age of seventy-seven years. He died Wednesday afternoon. His experiences on the lakes date back into the first half of the last century, for he sailed on The Lady of the Lake, plying between Cape Vincent, N. Y., and Kingston, Ont., as early as 1842. Later he became captain of the Fountain City, which, when he commanded her, in 1865, was the largest vessel on the lakes and ran between Buffalo and Chicago.

The Ohio Coal Co., a corporation of Minnesota controlled by coal men of Minneapolis and St. Paul, has been sold to a party of Milwaukeeans, the consideration being \$391,000. While the business changes hands it will continue in the same name, the purchasers having recently incorporated the Ohio Coal Co. under the Wisconsin statutes. The old Ohio Coal Co. was organized in 1885 with Frank H. Peavey, Thomas Lowry, T. B. Casey, Edgar C. Michener, W. E. Burwell, A. T. Rand, all of Minneapolis, and A. E. Rood of St. Paul, as incorporators. The headquarters of the company have always been in Minneapolis. The company was organized with a capital stock of \$500,000 and with a limited indebtedness of \$750,000. When amended articles were filed in 1896 James Ellsworth was president of the company and D. B. Smith, jr., secretary. Of late years the latter has been the general agent with no financial interest in the business. The new Ohio Coal Co. is composed of David C. Owen, Charles F. Hunt and Guy D. Goff as the board of directors.

On each of the new side-wheel passenger steamers, Eastern States and Western States, to run between Detroit and Buffalo, the crew will number 172, made up as follows: One captain, one pilot, one first officer, four wheelmen, two lookouts, one purser and one assistant, one engineer and two assistants, one electrician, four greasers, twenty-four firemen, two clerks, two stewards and two assistants, one dining room head waiter and thirty waiters, two night patrols, two day patrols, two baggagemen, six porters, one chef and six assistants, one baker and one assistant, one pantryman and five assistants, two coffeemen, two china men, one head steward and eight maids, one head bell boy and six "hops," two men in officers' mess room, one in firemen's mess room, two boys in seamen's mess room, head buffet man, an assistant and four helpers, two deck watchmen, twenty deck hands, one dining room cashier, one cigar stand man, one news stand man, two barbers and a "shiner," and eight members of the band.

## GREAT LAKES ENGINEERING CO.

Great Lakes Engineering Co. is the name of a corporation just organized to take over the business of S. F. Hodge & Co. of Detroit, one of the oldest engine and boiler concerns of Michigan. The new company was organized by John R. Russel of the Russel Wheel & Foundry Co. Associated with Mr. Russel in the purchase of the Hodge works are: H. W. Hoyt, vice president of the Allis-Chalmers Co.; Antonio C. Pessano, vice president and general manager of the Geo. V. Cresson Co. of Philadelphia; Geo. H. Russel and John A. Penton. The following officers of the new company were elected a few days ago. President and general manager, Antonio C. Pessano; vice president, H. W. Hoyt; secretary and treasurer, John R. Russel; directors, the foregoing with Geo. H. Russel and J. A. Penton. The capital stock remains the same as that of the Hodge company, \$200,000. The business will be substantially that of the old company, the manufacture of marine and stationary engines, mining machinery, propeller wheels and general jobbing foundry work. Mr. Pessano has resigned as an officer of the Geo. V. Cresson Co. and disposed of his holdings, and will remove to Detroit. The Hodge works were started in 1863, the original firm being Cowie, Hodge & Christie. In 1865 the firm became Hodge & Christie, and a few years later Samuel F. Hodge became sole proprietor. The present corporation dates back to 1883.

## MAGNETIC CHART OF LAKE SUPERIOR.

It was reported some time ago that the engineer department of the government, in charge of the lake survey, contemplated the publication of a magnetic chart of Lake Superior. In a letter of recent date to the Review, Major W. L. Fisk, who is in charge of the lake survey office at Detroit, says:

"The subject of magnetic observation has received considerable attention in this office and it is intended to continue them in connection with the other work of the lake survey as has heretofore been done. As to whether a special chart devoted to magnetic curves only is desirable is a question not yet decided. Our charts now show the latest magnetic determinations at all places where reliable observations have been taken, and it seems quite probable to me that this would be more convenient than to be obliged to go to a special chart for such information. As the magnetic variation at Grand Marais, Minn., determined in May, 1887, varies from 2° west to nearly 24° east within a distance of about a mile, it is quite evident that a magnetic chart would be of little use in that particular locality."

## THE NAVAL ENGINEER.

One who signs himself "Expert" has just written to Engineering of London a communication on the subject of "Naval Engineers" which will undoubtedly be read with interest by the engineering branch of the United States navy, particularly since the personnel bill seeks to make both branches interchangeable in this country. The "expert" is evidently well informed. He writes:

"I beg to bring the following facts to the attention of all candidates who aspire to enter the navy as an engineer. A great proportion of their duty consists in 'how not to' carry out their engineering work with method and system, but to subvert their plans to the puzzle of naval life. Something has gone wrong inside one of the many intricate machines on board ship, and the engineer is thoughtfully diagnosing its probable complaint, when he may be sent for because the stoker has made a dirty foot-print on the deck; his train of thought has been lost by such an interruption, and his mind has to begin to array the arguments all over again, and, perhaps, before he has time to effectually repair his machine, it is wanted in a great hurry, and he has a new problem to solve in getting it together to work for a time. He has from 100 to 300 men under his charge, a judicious selection of necessary repairs and work to be done has been made, each man's part thought out with all the attention to detail which engineering involves, when his thoughtful care is found to be of no avail, because his men are wanted for some deck requirement not known beforehand, or, may be, forgotten by the executive officer; his plans, besides embracing all the technical intricacies of his own profession, always have to take into account drill on deck on Mondays and Fridays, keeping his men stationed at their posts for morning evolutions, sending a proportion of his men every week through small-arm drill, etc.; the bilges may want pumping out, the main drain want to be flushed, stores want drawing from the dock yard, but the commander's boats are the first consideration, and these necessary operations have to wait. Other instances might be given, but I think enough has been said to show that deck requirements add considerably to the burden of working what is already a very trying department. If any young aspirant is keen on naval engineering as a profession, he must also remember he will have responsibility for valuable stores and have to keep the accounts for drawing and expenditure of same; such clerical work, not being very simple, takes up a considerable portion of time from the exercise of his profession; and after an engineer has finished chasing the feed-water for a Belleville boiler, to find out where it has disappeared, or, having caught it, tested it for trace of salt, for alkali, or acidity, he may come up from below, inspect his men for cleanliness, and measure if their collars are of the proper depth, etc.

"For about the same cost a parent may make his son an engineer or a doctor in the navy; the latter enters on 14s., the former on 6s., per diem; or a boy may enter the paymaster branch at trifling cost to the parent. Compare the rates of pay of these three branches:

Age.	Engineer.	Doctor.	Paymaster.
24	7s. 6d.	14s.	7s. per day.
28	10s. 0d.	17s.	9s. per day.
32	11s. 0d.	20s.	15s. per day.
36	16s. 0d.	24s.	17s. per day.
48	27s. 0d.	33s.	33s. per day.

Note.—At ages 36 and 48 the engineer, if in a commissioned ship, may get 2s. and 5s. a day respectively added as charge pay; between ages 32 and 36 he may, or may not, be senior engineer, and get 1s. to 2s. 6d. added to his pay.

"For less than half the cost of sending a boy to Keyham, civil engineering may be learned, and at the age of twenty-four a salary of £180 per annum be obtained by entering the dock yards as assistant civil engineer, and the latter will not have expensive uniforms to buy. Anyone of average engineering ability may enter Lloyd's Register as a surveyor on a salary of £200 per annum, and Lloyd's give what is often a great attraction to enter the navy, namely, a pension. With electrical appliances expanding in every direction, the possibilities of finding good openings for enterprising men are extending; while to anyone of good ability, the prizes in engineering firms as managers, with salaries of £1,000 to from £3,000 to £4,000 per annum, must be very attractive. Contrast the English navy with the Japanese. In the latter the pay of the chief engineer is inferior to that of the captain only. An engineer will always do his duty; but more is required, and that is enthusiasm. What encouragement is given him to foster that high quality?"

## MORE ANNOYED THAN WORRIED.

A New York dispatch says that officials of the United States Steel Corporation claim to be more annoyed than worried over the action begun by C. H. Verner & Co. of New Jersey to restrain the corporation from carrying out its conversion scheme. The corporation's attorneys say they are confident of the legality of the conversion. They say there is not the least vestige of fear that the program will be at all embarrassed. It is annoying, of course, to have these attacks exploited in the newspapers, and as they multiply it becomes more than a suspicion that they are inspired by interests unfriendly to Mr. Morgan and his associates. Hints of this have been current in Wall street for quite a while, and there are a great many observers who believe they could indicate the source whence these attacks are inspired. It is deemed improbable, for example, that of a sudden certain lawyers and financial critics should engage in a bearish discussion of the United States Steel Corporation's policy of finance without having some general motive back of it all. The Morgan party has its enemies in Wall street, as any successful party is bound to have, and there are both speculative and financial interests who might be expected to sympathize with a bear campaign against United States Steel Corporation shares. A great deal of bearish literature on these and other Morgan stocks is coming to the surface in Wall street. Professional comment is that if Mr. Morgan himself was at home these petty attacks would soon cease.

At a recent meeting of directors of the United States Steel Corporation, William E. Dodge and Percival Roberts, Jr., resigned from the board. Mr. Dodge is succeeded by Robert Bacon of J. P. Morgan & Co. James Gayley, first vice president of the steel corporation, and in charge of its iron mines and transportation, was elected to succeed Mr. Roberts.



### SKETCH OF MR. ALEXANDER E. BROWN.

Mr. Alexander E. Brown, vice-president and general manager of the Brown Hoisting Machinery Co. of Cleveland, is so well known to readers of the *Marine Review*, on account of the important part he has taken in the development of machinery for handling ore and coal on the great lakes, that a sketch of his business career would seem almost superfluous. A New York publication, *Cassiers' Magazine*, has prepared such a sketch, and it is reprinted herewith:

In the comparatively short period of twenty years the Brown Hoisting Machinery Co. of Cleveland has developed into the largest establishment of its kind in the world, with from 1,200 to 1,400 men in its works, with traveling representatives all over the world, and with its various products likewise distributed in many lands. No better introduction than this could be given to the ruling spirit of this enterprise, Mr. Alexander E. Brown. Mr. Brown was born in Cleveland in 1852, and was educated at the public schools of that city, the Central high school and the Polytechnic Institute of Brooklyn, N. Y., where he took a special course in civil and mechanical engineering in 1872. Then the lad went with Dr. F. V. Hayden on the original United States geological survey to Yellowstone park, which occupied him for one year. Afterward he became chief engineer of the Massillon Bridge Co., remaining with that company until 1874. Then he established himself as a general mechanical and civil engineer in the city of Cleveland. Mr. Brown made a specialty of iron, steel, and blast-furnace work, also paying attention to mining and railroad engineering. He designed and put into use a system for malleable iron works for charging and handling material to and from the annealing ovens, which is now generally in use, and is controlled by the National Malleable Casting Co., who bought the patents.

From 1878 to 1879 Mr. Brown was engaged by the Brush Electric Co. as mechanical engineer and chief assistant to Charles F. Brush, the inventor of the Brush lighting system. In 1880 he took up the question of the handling of materials and the betterment of terminal facilities at the lake ports, more particularly in regard to iron ore and coal, and since that time has been continuously engaged in the manufacture of machinery for this purpose. To what extent he has succeeded is proved by the present existence of the Brown Hoisting Machinery Co., which is successor of the Brown Hoisting & Conveying Machine Co., organized by Mr. Brown in 1880.

The first plant was erected on the Erie docks at Cleveland, and the system has practically revolutionized the entire lake trade, increasing the output and expediting and cheapening loading and unloading of vessels to such an extent that today the vessel freights on the lakes are about one-quarter of the lowest freight for similar distances and cargoes anywhere else in the world. The increased and better terminal facilities have also produced an entire change in the type, kind, and size of the lake vessels. In 1880 a vessel of from 1,000 to 1,200 tons capacity was a rarity and considered very large, while today a vessel of from 7,000 to 8,500 tons (net) is the size commonly built, and the largest boats of 1880 can no longer engage in the trade profitably.

The system, however, is not only in use for the loading and unloading of vessels, but is operated in the largest iron and steel works and iron mines. Recognizing the results obtained in this country by the various classes of machinery designed and built by the Brown Hoisting Machinery Co., foreign manufacturers of steel and iron, mine owners and shippers have installed and are rapidly installing the system in their various plants, in order to meet American competition. There is scarcely a country in the world without some specimen of the Brown Hoisting Machinery Co.'s manufacture. Mr. Brown has taken out many hundreds of foreign and American patents to protect his inventions during the last twenty years, covering every phase of hoisting, conveying and handling of material in large manufacturing plants. In December, 1900, a fire destroyed the works of the Brown company, and an entirely new plant was laid down, with double the capacity, on the same area as the old plant, and supplied with every modern appliance, the area covered being about ten acres. Mr. Brown is the vice-president and general manager of this large corporation. He is also a member of the American Society of Mechanical Engineers, the American Institute of Mining Engineers, the Society of Civil Engineers of Cleveland, the Society of Electrical Engineers of Cleveland, the Union and Country clubs of Cleveland, and the Engineers' Club of New York.

### SKETCH OF MR. HENRY G. MORSE.

The New York Commercial, in its "Mostly Personal" column, has the following sketch of Mr. Henry G. Morse, president of the New York Ship Building Co. of Camden, N. J.:

"One of the 'captains of industry' who has created a monument to his energy and ability is Henry G. Morse, president of the New York Ship Building Co. Three years ago the great ship yard on the New Jersey bank of the Delaware river just below Camden did not exist even on paper. The site on which it stands was nothing but a cornfield and potato patch. Mr. Morse is responsible for what has been done there. His mind conceived the idea, and his resourceful energy has carried it into practical effect. This ship yard itself must be considered in order to understand Mr. Morse—for his life is bound up in it and its success. It will be readily understood why this is so when it is known that the unique plan on which this ship building plant is built is Mr. Morse's own. In broaching the scheme to the business friends who joined him in it as capitalists, he proposed that the ship yard should be built in a way that no other such establishment in the world is arranged. He was told to go ahead and carry out his radical ideas. Nothing was too good for this new ship yard. The most unique feature of it is that the whole thing is under one roof. It is the only ship yard in the world so constructed. Not only the machine shops, but the stocks upon which the hulls are laid and the water space occupied by the ships after launching while they are being fitted up and finished, are all under cover. Thus stormy weather does not interfere with the progress of work in the New York Ship Building Co.'s yards. More than this the departments are so arranged that there is a regular progression of material from the point where it is delivered into the yard from the Pennsylvania railroad and the Philadelphia & Reading cars until it finally reaches its place in the ship. All this Mr. Morse planned out before a sod was turned—his great aim being to economize labor. At the present time 3,000 men are employed in the ship yard, and the company

has contracts aggregating approximately \$10,000,000. These include several steamships, one of them 600 ft. long.

"A large man, quite stout, is Henry A. Morse, the real head and director, as well as the creator of the New York Ship Building Co. He is anything but lethargic in body, however, while in mind he is conspicuously alert. He dresses without any great attention to looks, and rather for comfort in work. In his office he is apt to keep his derby hat on, shoving it back from his forehead; and, when talking, he raises his gold-rimmed spectacles so that they rest on his forehead. Mr. Morse's office is a room about 15 ft. square, lighted from two sides, and on the ground floor of the large two-story brick and stone building used by the executive, clerical and engineering forces of the company. In the middle of the room stands a small oak table, about 3 by 5 ft., which Mr. Morse uses for work—and he does a heap of it. He invites visitors to sit opposite across the table, and when he wants a paper he reaches back over his shoulder to the desk. As intimated, Mr. Morse himself really 'runs' the whole ship yard. His capacity for detail is remarkable, and he keeps thoroughly in touch with the progress of everything in the entire yard. He reaches his office early and is often still there after everybody else has gone home in the evening. His daily practice is to go through the whole works, consulting with the heads of departments, whom he is fully capable of advising and directing. In fact, he is the directing manager of 'the whole business.' Mr. Morse is now about fifty-five years old. He graduated as a civil engineer from the Rensselaer Institute of Technology at Troy, N. Y., and then took a position in an iron and bridge works at Youngstown, O. Later he became president of the Edgemore Bridge Works, now in the American Bridge Co., and later still of the Harlan & Hollingsworth Co. at Wilmington, Del. That position he resigned, after serving a number of years, to take up his present great work. In very moderate style Mr. Morse lives in a small house at Woodbury, N. J., a few miles south of the ship yard. When not at the yard or away on business connected with it, he is almost always to be found there."

### SUMMER SCHOOL AT NAVAL WAR COLLEGE.

The naval war college at Newport has just opened for summer work with an unusually large class of officers assigned for the course of instruction. The problem to be worked out has been prescribed by the general board, of which Admiral George Dewey is president, and relates to a supposed attack by the enemy on some section of the New England coast and its defense by the fleets co-operating with the shore fortifications. These problems are entirely theoretical and their solution remains a carefully guarded secret for reference in event of war. A curious fact is that the problem solved just previous to the Spanish war was an attack by a foreign power having its base in the West Indies, avowedly Spain, and the offensive methods that would be pursued by the United States with squadrons operating from Key West as headquarters. It is said that Admiral William T. Sampson's maneuvers and program of patrol and blockade around Cuba and the eastern passage were based largely on the problem worked out previously by the war college class and filed away in the office of naval intelligence for reference. The session of the college will continue until Oct. 1, when the officers will be detached and ordered to new duties. In connection with the problem it is proposed to employ the North Atlantic fleet in solving some of its features. Landing parties will be made on Nantucket island and a sham battle fought between a land force and the ships with the marines in charge of the shore defenses. Later in the summer the squadron will co-operate with the army in the maneuvers at the eastern entrance to Long Island sound in which the vessels will simulate an attack on the shore fortifications and their defense will be made by the artillery, with some of the Massachusetts state artillery assisting. This part of the program is now being arranged by Col. W. F. Randolph, chief of artillery.

### CHANGES IN NAVAL APPROPRIATION BILL.

The naval appropriation bill, as reported to the senate Tuesday, has several changes of importance from the house bill. The committee reports in favor of all the new vessels recommended by the house (two battleships, two armored cruisers and two gunboats), and at the prices fixed in the house bill, but strikes out the provision for building one battleship, one cruiser and one gunboat in government yards, and inserts in place of it authority for the secretary of the navy to have the three vessels built in government yards if satisfactory bids for their construction cannot be had from private yards. This practically operates against the building of the ships at government yards. Another change authorizes the construction either of a battleship or cruiser on the Pacific coast. The secretary of the navy is authorized to contract with the Holland company for five submarine boats, and he also may have tested any other submarine boat, and purchase one at a cost not to exceed \$175,000. The bill, as reported, increases the appropriation made by the house \$546,905, making a grand total of \$78,166,838.

The committee recommends the increase in the number of cadets at the naval academy by ninety-five, each senator to have the appointment of one and the president five at large, in addition to ten under existing law. The rank of the commandant of the marine corps is raised from brigadier-general to major-general, and the enlisted force of the marine corps is increased by 750 men, as recommended by the secretary of the navy.

Some interesting comparisons are to be made from the figures embraced in the annual report of the United States Steel Corporation. The average number of men employed by the Corporation last year was more than 158,000. The net earnings of the Corporation were \$111,000,000. It appears, therefore, that the Steel Corporation realized during the year about \$702 net for each man in its employ. The average wage of each employe figures out to have been about \$2 a day, or \$712 a year. Each employe, therefore, netted the combination only \$10 less a year than he received in wages. The total of wage disbursements was about \$1,000,000 larger than net earnings.

One of the latest pamphlets from the C. W. Hunt Co., 45 Broadway, New York, deals with coal handling machinery for power stations. This company has been designing, manufacturing and installing coal apparatus since 1872. Their machinery is in daily use in almost every country in the world.



## RELATIVE STRENGTH OF NAVAL POWERS.

This table, prepared by the Office of Naval Intelligence, United States navy department, shows the relative naval standing of the United States, and at the same time gives an idea of the trend of naval construction. The table does not include the program of building contemplated this year (1902) by the several naval powers. It may be said in this regard, however, that the relative standing will not be changed by the advance now contemplated by the several nations striving for greater power on the sea:

TYPE.	UNITED STATES.				GREAT BRITAIN.				FRANCE.				GERMANY.			
	Built.	Tons.	Build- ing.	Tons.	Built.	Tons.	Build- ing.	Tons.	Built.	Tons.	Build- ing.	Tons.	Built.	Tons.	Build- ing.	Tons.
Battleships, first class (above 10,000 tons).....	9	99,830	8	111,700	42	557,800	11	163,500	19	210,275	3	41,790	9	95,782	7	86,000
Other battleships and coast-defence ironclads....	8	34,575	4	12,856	29	199,415			25	123,690			13	66,800		
Armored cruisers .....	2	17,415	6	82,800	19	163,330	21	225,200	10	62,240	13	127,365	5	44,625	2	17,600
Protected Cruisers, first class above 6,000 tons....	2	14,750	3	28,800	21	201,950			4	31,255			6	36,800		
Protected cruisers, second class (3,000 to 6,000 tons)	12	47,100	6	18,600	54	238,320	2	11,760	20	84,500			3	12,908		
Protected cruisers, third class (below 3,000 tons)...					40	92,085	2	5,800	15	25,260			13	28,655	4	11,200
Unprotected cruisers (above 1,000 tons) .....	28	53,875			22	29,890	6	6,880	15	25,845			12	20,725		
Gunboats (below 1,000 tons).....	10	7,875			64	50,320			22	12,710			13	10,905		
Torpedo-boat destroyers .....			16	6,695	111	35,925	53	18,500	12	3,520	20	5,965	28	8,475	7	2,450
Torpedo boats, first class (above 100 tons).....	21	3,305	9	1,724	77	4,590	6	900	44	5,680			23	3,500		
Torpedo boats, second class (below 100 tons).....	6	285			89	3,175			185	12,605	32	2,835	109	8,050		
Submarine boats .....	1	75	7	840	1	120	4	480	8	1,115	22	3,175				
Training vessels .....	8	24,740			9	6,085			9	36,175			8	21,910		
Total displacement .....	107	303,825	59	264,015	578	1,583,005	105	433,020	388	634,870	90	181,130	242	359,135	20	117,250
Total built and building.....		166—567,840 Tons.				683—2,016,025 tons.				478—816,000 tons.				262—476,385 tons.		

TYPE.	JAPAN.				RUSSIA.				AUSTRIA.				ITALY.			
	Built.	Tons.	Build- ing.	Tons.	Built.	Tons.	Build- ing.	Tons.	Built.	Tons.	Build- ing.	Tons.	Built.	Tons.	Build- ing.	Tons.
Battleships, first class (above 10,000 tons).....	6	84,800			13	149,375	6	81,000			1	10,000	5	56,205	4	52,250
Other battleships and coast-defence ironclads....	5	17,505			24	119,305			16	69,630	2	16,630	7	40,340		
Armored cruisers .....	7	60,855			12	90,530			2	11,520	1	7,400	8	73,200	2	14,800
Protected Cruisers, first class above 6,000 tons....					5	32,890	5	31,600					2	30,955		
Protected cruisers, second class (3,000 to 6,000 tons)	10	41,485	2	6,400	5	18,330	3	9,700	1	4,065			5	17,550		
Protected cruisers, third class (below 3,000 tons)...	4	10,670							3	6,445	1	2,440	12	30,100		
Unprotected cruisers (above 1,000 tons) .....	11	16,175			19	29,020			8	12,960			7	8,630		
Gunboats (below 1,000 tons).....	13	7,545			11	6,290			13	6,350			14	10,085		
Torpedo-boat destroyers .....	11	3,180			21	5,970	30	10,350					7	2,200	6	1,880
Torpedo boats, first class (above 100 tons).....	12	1,610	10	1,420	39	4,675	27	3,300	6	700			11	1,400		
Torpedo boats, second class (below 100 tons).....	69	4,715	12	860	128	5,930	3	270	63	3,660			131	9,050		
Submarine boats .....													1	100		
Training vessels .....	4	2,560							2	6,860						
Total displacement .....	152	251,100	24	8,680	277	462,315	74	136,220	114	122,160	5	36,520	210	279,815	12	68,930
Total built and building.....		176—259,780 tons.				351—598,535 tons.				119—158,680 tons.				222—348,745 tons.		

### HAMBURG-AMERICAN LINE AND THE COMBINATION.

At a meeting of the shareholders of the Hamburg-American Steamship Co. a resolution was adopted providing that the articles of association should be so altered as to conform with the Atlantic steamship combination. Herr Ballin, speaking in behalf of the Hamburg-American line, said that the German lines were not combined in the trust but simply worked in harmony with it. He added that all three interests were equal. It was announced that a committee of three headed the Atlantic steamship combination as far as Europe is concerned. The committee is composed of Mr. Willing, representing the American controlling syndicate; W. J. Pirrie, representing Harland & Wolff of Belfast, Ireland, and Herr Wiegand representing the German interests. All three interests are equal. Dr. Hahn, a shareholder, said that it would have been better if the company had taken advice with the government before it concluded the contract. He did not believe that the German companies under the present arrangement would maintain their German character. Herr Tietgens, chairman of the company, replied that if the German lines had refused the trust's offer they would have had to encounter the most formidable opposition. It was a palpable necessity that they combine, otherwise the results would have been disastrous. In reply to an inquiry as to whether the American railways connected with the trust constituted a danger to German interests by lowering freights for American goods en route to Germany, Herr Ballin said the Hamburg-American company would not attempt to make any such reduction. Freight rates would be raised all around. Besides, he added, American railways were not interested to create an export trade. They were anxious for imports in order to fill their cars which were now returning empty from the seaports. Herr Ballin and Herr Wiegand, the German members of the combination committee, control 30,220 of the shares represented at the meeting.

### NORTH GERMAN LLOYD AND THE COMBINATION.

Herr Wiegand, director general of the North German Lloyd Co., has given out in Berlin an interview dealing with the shipping combination. He announces that a general meeting of the stockholders of the North German Lloyd will be held in Bremen in the near future when the status of the company will be changed and the agreements arrived at with the Morgan combination given full publicity.

"The North German Lloyd Co. made agreements similar to those made public by the Hamburg-American line," said Herr Wiegand. "We are not keeping anything back and we have made no secret compact with Mr. Morgan, as I see repeatedly charged. I have not been to Bremen since meeting Mr. Morgan in London, but I shall issue a statement as soon as I arrive there, in which I intend to set at rest all statements of this kind and also give substantial proof that there is no danger from the so-called American peril. It is folly to speak of Mr. Morgan as swallowing the German lines. The international combination between England and the United States was bound to come. English shipping interests had no other alternative. The combination does away with injurious competition. Nor do I believe England's prestige upon the ocean is seriously imperiled by Mr. Morgan's influence."

"As for the so-called Morganization of the German lines, I can state

positively that we are not the least bit alarmed. The German lines must remain German, for as soon as they change they will cease to be as efficient and highly developed as they are. Nor is it within the bounds of reason to suspect Mr. Morgan of trying to obtain control by secretly buying up shares here. That is all provided against. Even if such designs existed, the agreement with the Morgan lines gives us the advantage that we have a combined rival in place of a large number of scattered ones. All drawbacks of rate-cutting and of overplus of steamers when traffic is light are now avoided. I do not expect any increase of freight or passenger rates."

Herr Wiegand also said that Germany had every reason to be gratified by the joint contract between the German and the Morgan lines. He added that the Kaiser was pleased with the turn of affairs and that dividends in the near future would demonstrate that the German companies had not been injured by the new combination. German journals continue to give circulation to the charge that Director-Generals Wiegand and Ballin arrived at a secret understanding with Mr. Morgan and are holding back information.

### WHITE STAR WENT FOR A GOOD FIGURE.

Regarding the basis of the White Star purchase by the Morgan shipping combination the following from one of the English shipping journals is significant. It shows that the purchase was very favorable to the holders of the White Star shares:

"Although the profits of the White Star Co. for the typical year of 1900, which are made the basis of the deal—that is to say, ten times that amount is to be taken as the purchase price of the line, etc.—are not stated, those profits must be known to a penny, and it is to be regretted that no light is thrown on the matter. That 1900 was the best year that shipping—especially of the class of tonnage acquired by the trust—has ever known is beyond dispute, and here is an illustration which will show how 1900 compares in that respect with 1901. In the Cunard Steamship Co.'s accounts the balance of income over expenditure, including repairs and insurance, was £538,080, which, less the depreciation at 6 per cent. as specified in the contract, £116,223, leaves £421,857. This on a ten years' purchase would give £4,218,570 for the Cunard fleet. The present market value of the Cunard shares (£1,600,000) is £1,274,000. The profits of the same company in 1901 amounted to £195,849, or, after deduction of the 6 per cent. for depreciation (£107,108), £88,741. This on a ten years' purchase would give £887,410. These figures speak for themselves."

Mr. George Crouse Cook, who is in charge of the department of naval architecture at the New York Nautical College, announces that during the regular summer vacation of the college the naval architecture work will be continued in his office at 15-25 Whitehall street, New York city, for the accommodation of all students wishing to take up studies on this line. "The training offered is directly practical," says the circular, "and assures each student a thorough working knowledge of the elemental and advanced ship calculations in relation to displacements, centers, stability, strength and propulsion; types and methods of hull construction in wood and steel; theoretical principles of ship design and their actual application in the execution of a complete design, which must be prepared by the student before receiving diploma."



### ENCOURAGING TO MANUFACTURING INTERESTS.

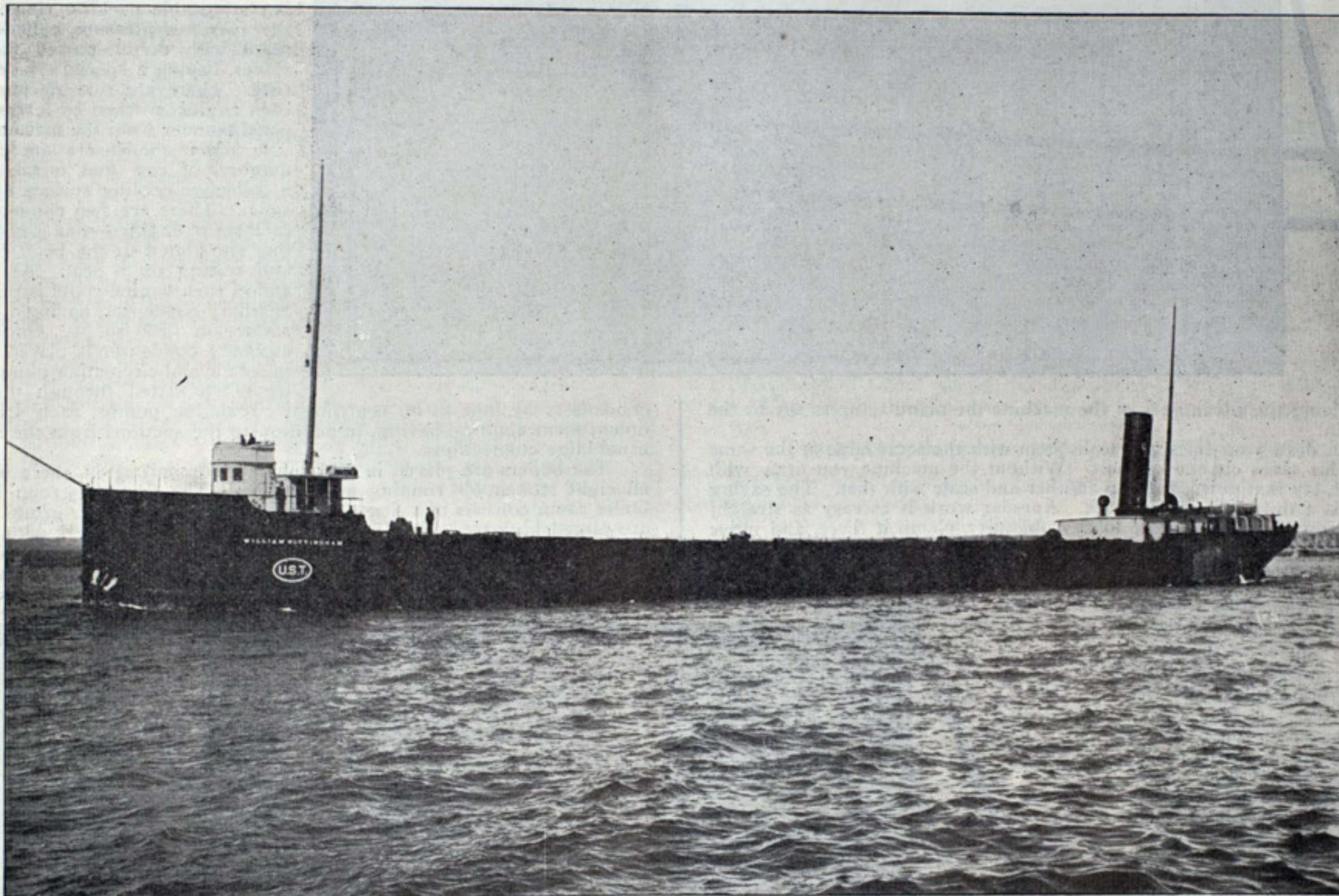
A good deal of encouragement to the manufacturing interests of the country is found in the detailed statement of commerce for the month of April and the ten months ending with April, just issued by the treasury bureau of statistics. It shows that manufacturers' materials formed one-half of the importations during the month of April, and in the ten months formed over 16 per cent. of the total; while the exports of manufactures in the month of April formed 36.54 per cent. of the total exports, against 29.15 per cent. in April, 1901, and for the ten months ending with April, 1902, they formed 28.55 per cent. of the total exports, as compared with 27.40 per cent. in the corresponding months of the preceding fiscal year. The total value of manufacturers' materials imported in the ten months ending with April this year is \$348,657,061, as against \$280,801,407 in the corresponding months of last year, an increase of \$67,855,654, or 24 per cent. Exports of manufactures, it will be observed, are nearly overtaking those of last year, the gain in the month of April alone being \$4,500,000 over April, 1901, while for the ten months the total value of manufactures exported falls but \$5,486,814 below that for the corresponding months of last year. Manufactures formed considerably more than one-third of the exports in the month of April, having formed 36.54 per cent. of the total, against 29.05 per cent. in April, 1901; while for the ten months the percentage which manufactures form of the total exports is higher than in any preceding year except 1900.

In imports of manufacturers' materials the growth is found in almost every important class of articles. Chemicals, which are largely used in

those of last year. The exports of domestic manufactures for the ten months total \$333,820,809, against \$339,307,623, a decrease of \$4,500,000; while the fact that April alone made a gain of \$4,500,000 over April of last year indicates that the fiscal year 1902 will probably equal the record of 1901. An analysis of the exports of manufactures indicates that the chief reduction is in iron and steel manufactures, and that there are marked increases in other lines. Iron and steel manufactures alone, chiefly by reason of the unusual home demand, fell \$16,000,000 below the exports of last year; while the fact that the total exports of manufactures are but \$5,500,000 less than those of last year indicates that in other lines of manufacture there has been a marked gain.

### A FINE LONDON-NEW YORK STEAMER.

The steamship Minnetonka, 600 ft. long, 65 ft. broad and 44 ft. deep, and of about 13,400 tons gross register, is the latest and finest vessel in the London-New York service of the Atlantic Transport line. As announced in the Review of last week, she has just finished her maiden trip to this country, fresh from the hands of her builders, Harland & Wolff, Belfast, Ireland. She is propelled by two sets of quadruple-expansion engines, which, as well as the boilers, were built by Harland & Wolff. Accommodation has been provided for a large number of first-class passengers and the vessel has besides great capacity for carrying cargo, provision having also been made for about 700 head of cattle on the upper deck and permanent stalls of the most approved kind for nearly 200 horses on the same deck. The necessary appliances for handling in the most expeditious



STEAMER WILLIAM NOTTINGHAM, ONE OF THE 1902 TYPE OF LAKE FREIGHTERS.  
Owned by United States Transportation Co., W. W. Brown, Mgr., Cleveland.

manufacturing, show a growth from \$44,500,000 in the ten months of last year to over \$48,000,000 in the ten months of the present fiscal year; raw cotton, from 39,000,000 lbs. to 87,000,000 lbs.; copper ore, from \$8,000,000 in value to over \$12,000,000; fibers, for use in manufacturing, from \$18,000,000 to \$25,000,000; hides and skins, from \$37,000,000 to \$49,000,000; raw silk, from \$23,000,000 to \$36,000,000; tin, from 59,000,000 lbs. to 64,000,000 lbs.; leaf tobacco, from 12,000,000 lbs. to 15,000,000 lbs; wool, from less than \$10,000,000 to over \$15,000,000, and wood from \$12,000,000 to \$15,000,000.

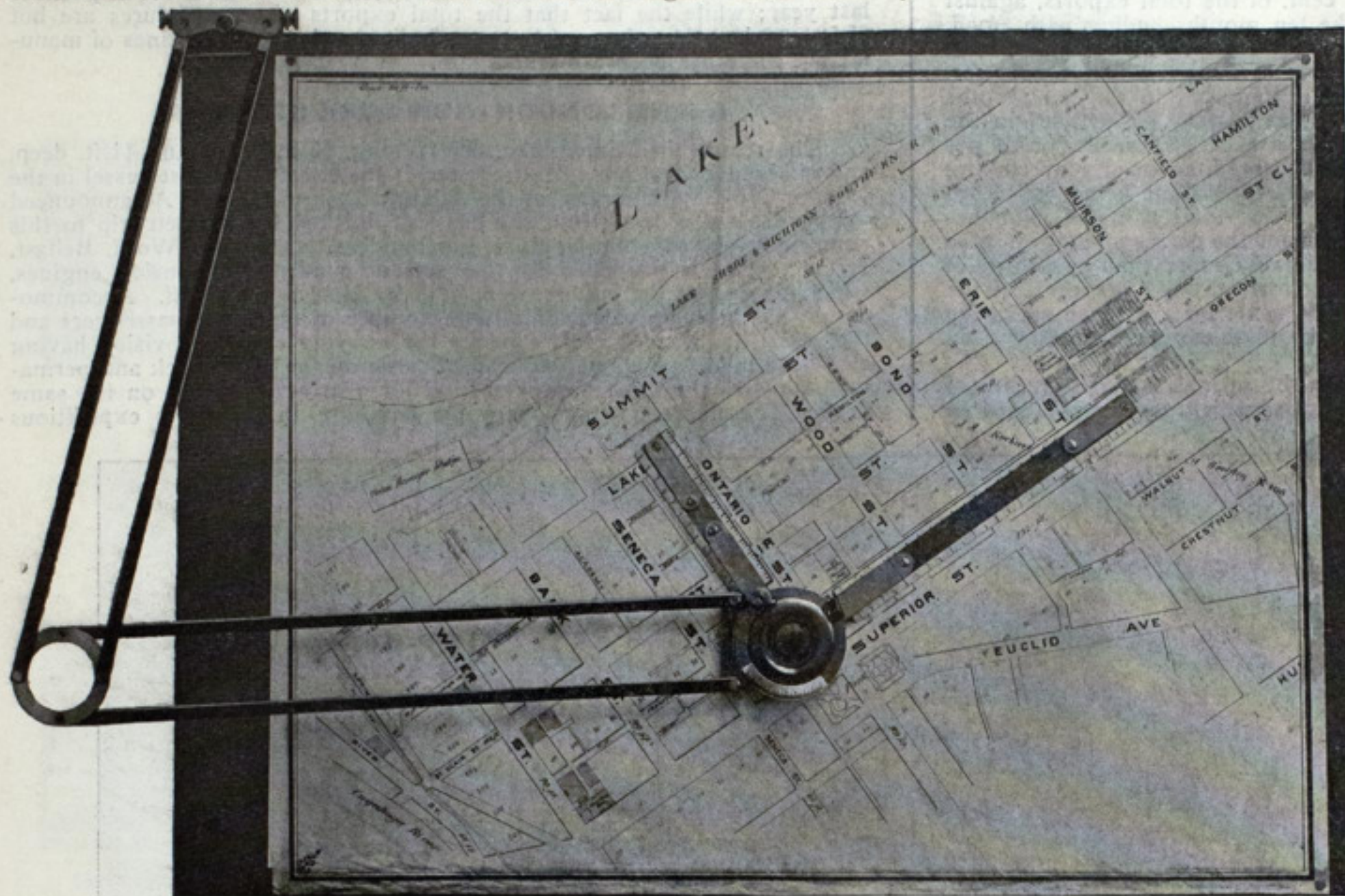
On the export side the largest increase in manufactures is in cotton goods, which in the present fiscal year will exceed by 25 per cent. the figures of any preceding year. For the ten months ending with April the total exports of cotton manufactures were \$26,436,379, and for the single month of April were \$3,032,718, indicating that for the full fiscal year the total will exceed \$30,000,000. The highest figure in exports of cotton manufactures ever reached in any preceding year was \$24,003,087 in 1900. A comparison of the figures of the present fiscal year with those of the earlier part of the past decade shows that the exports of cotton manufactures have doubled since 1895. Prior to that year their total value had never reached so much as \$15,000,000. In 1897 the total value of cotton manufactures exported was \$21,000,000; in 1899, 23,000,000; in 1900, \$24,000,000, and in 1902 will, as above indicated, exceed \$30,000,000. This increase is chiefly in cotton cloths, and a large proportion of the growth is in exports to China. Our exports of cotton cloths to China have more than doubled since 1900, the total for ten months having advanced from 164,000,000 yards in 1900 to 372,000,000 yards in 1902. The total exports of manufactures, as already indicated, have nearly overtaken the figures of last year, and for the full fiscal year seem likely to be quite as large as

manner a large cargo have been provided and are of the most improved character. Electric light has been installed throughout and refrigerating apparatus provided. The first-class entrance is situated at the forward end of the bridge deckhouse, and is neatly framed in polished light oak panels. A handsome staircase in oak leads to the dining saloon below on shelter deck and to the library above on boat deck. The saloon, which is situated on the shelter deck amidships, is a fine apartment occupying the whole breadth of the ship, with walls of light oak polished panels with poker work; a handsome dome overhead of painted and leaded glass, with richly carved frieze, is supported by oak columns. There is a piano-forte at the forward end in light oak case. The library is contained in a deckhouse at the forward end of the boat deck. The walls are artistically panelled in white and gold, while the furniture is of polished mahogany with maquette embellishment. The ceilings of the foregoings are all done in lincrusta in white and gold. The upholstery work of the saloon and library is of tapestry and the floors of parquetry. The smoke room is situated in a deckhouse at the after end of boat deck, with entrance from boat deck and bridge deck. The walls are beautifully panelled in oak, with walnut dado, and the seats are upholstered in rich crimson Morocco leather. The ceiling is panelled with lincrusta in cream and white. A large deckhouse on the bridge deck is fitted up for the accommodation of first-class passengers, the remaining accommodation being arranged for on the shelter deck aft of the dining saloon. The bridge deckhouse also contains special suites of fine airy rooms, consisting of bedroom, sitting room and bath room. These rooms are artistically panelled in white and gold. The furniture is of polished mahogany and the upholstery of narcissus tapestry.



### UNIVERSAL DRAFTING MACHINE.

The machine illustrated on this page is called the universal drafting machine. It is the invention of Mr. C. H. Little of Cleveland and is manufactured by the Universal Drafting Machine Co., Blackstone building, Cleveland. The main claim made for the machine is that it facilitates both design and detail by doing the drudgery part of hand work; work from which the mind is relieved and left free for higher mind work.



Summarizing the advantages of the machine the manufacturers say to the draftsman:

"You draw your lines and scale them with the same edge at the same time. This saves change of tools. Without the machine you draw with one edge, lay that down, pick up another and scale with that. The saving of time is a third in average work. Angular work is as easy as straight work. You adjust the square to any obliquity, clamp it there, and move it to any part of the board. It is always parallel to itself so long as one adjustment is kept. These two functions of the machine save time to the extent of a quarter to half, and distraction of mind less easy to value. All you have to do is to move the square to the place, and then draw and scale your line; the ruling edges take care of themselves."

The machine consists of a graduated square having an accurate parallel motion about the drawing board. The square is adopted because the work in most drawings consists of sets of lines at right angles. Both blades of the square are graduated for drawing and measuring lines at the same time. The blades of the square chuck into place — interchangeable — any length and any scale supplied. A straight edge is provided for inking. It may also be used for long lines. This, however, is not necessary, as lines may be quickly and accurately extended with the square. The parallel motion is obtained by means of two pivoted parallelograms, which constitute an arm joining the square to the board. This arm is made flexible, allowing the blades to lie flat upon the drawing. It is hinged at the connection to the board, and may be easily lifted out of the way of the paper. It may be readily changed from one board to another. The square is moved about the board as easily as though it were not joined to the arm. The whole machine is made in a very substantial manner. There is no play in joints. Compensation for wear is provided.

### THE LEVIATHAN, A GREAT SHIP OF WAR.

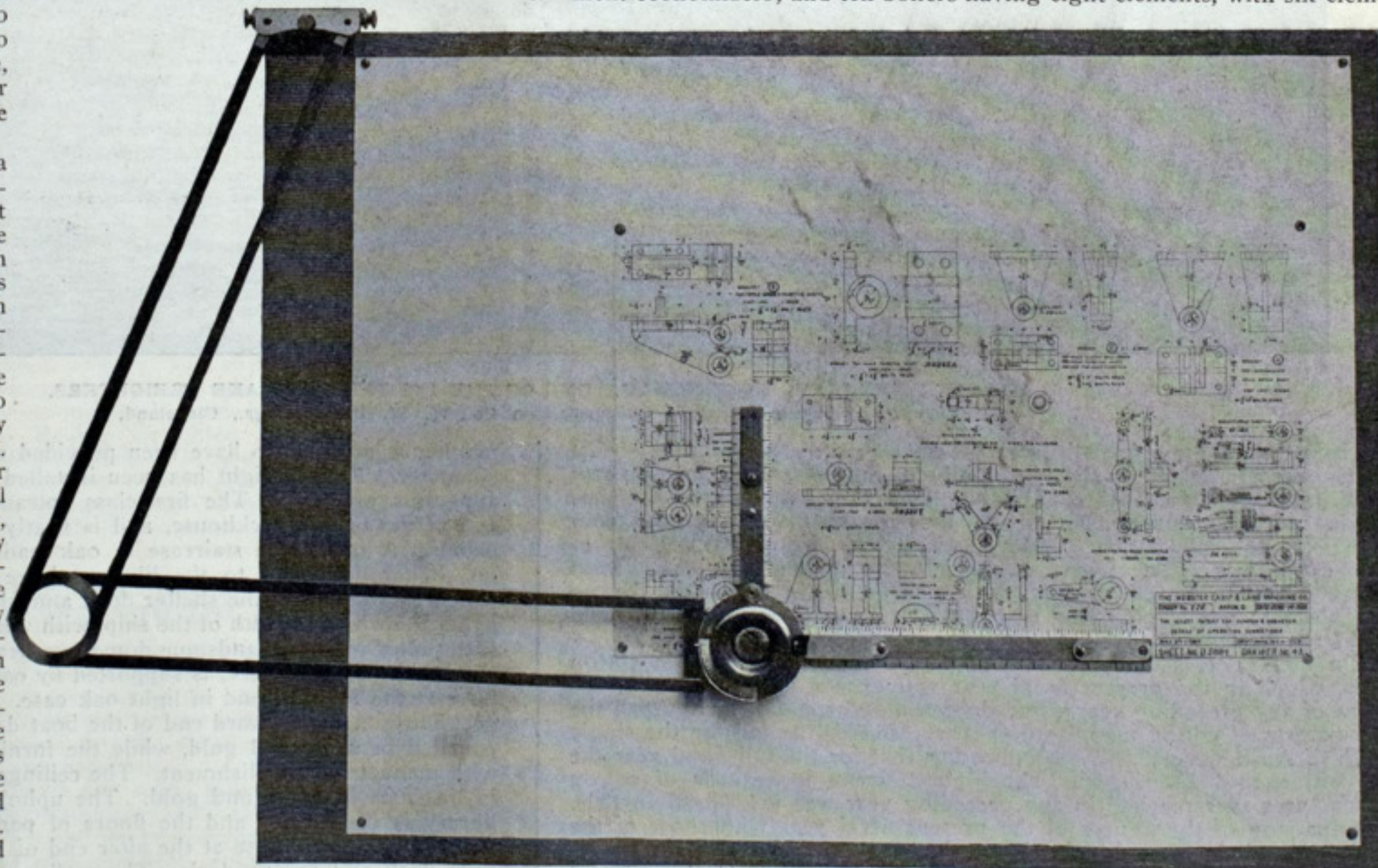
Recent tests of the first-class armored cruiser Leviathan of the British navy prove her to be, in point of power, the greatest warship afloat. The full power developed on the eight hours' test was 31,203 I.H.P., while

the mean speed on four runs over the long deep-sea course was 23.25 knots. The Leviathan is the second of four vessels of the Drake class to successfully pass through her steam trials, the first being the Good Hope. Her length is 500 ft., width 71 ft., and when in fighting trim she will displace 14,100 tons, the draught then being 26 ft. The vessel carries 2,600 tons of fuel in her bunkers, and will therefore be able to steam at a cruising speed of 14 knots for 12,500 sea miles without renewing her fuel supply.

The propelling machinery consists of two sets of four-cylinder triple-expansion engines; each of the two sets is designed to develop 15,000 I.H.P., steam being supplied by forty-three water tube boilers of the latest Belleville economizer type, working at a pressure of 300 lbs. per square inch. All the engine cylinders are fitted with separate liners and are steam-jacketed. The diameter of the high-pressure cylinder is 43½ in., that of the intermediate cylinders 71 in., and that of the two low-pressure cylinders 81½ in., each having a stroke of 48 in. The high-pressure cylinder is fitted with one piston valve of the inside type, the intermediate cylinder is fitted with two piston valves, having adjustable packing rings, whilst the two low-pressure cylinders are fitted with double-ported flat slide valves, having a special type of relief ring. There are two air pumps on each engine, worked by levers in the usual manner from the main engines. The main condensers are four in number, of cast gun metal, having a collective cooling surface of 32,000 sq. ft. There are two condensers to each set of engines—one forward and one aft, bolted to the back columns and resting on a seat. At the aft end of each engine room is placed an auxiliary condenser, having a cooling surface of 1,830 sq. ft. Under each auxiliary condenser is placed a combined air and circulating pump. Water is circulated through the main

condensers by four 24-in. centrifugal circulating pumps, each driven by independent engines, having, in addition to the suctions from the sea, the usual bilge connections.

The boilers are placed in four separate compartments, there being in all eight stokeholds running athwartships. The forward group in each boiler room consists of a single row of boilers, and the after group in each are placed back to back. There are thus forty-three boilers with economizers, namely, five boilers having ten elements, with eight-element economizers; twenty-eight boilers having nine elements, with seven-element economizers; and ten boilers having eight elements, with six-element



economizers. The total heating surface is 71,970 sq. ft., and the grate area 2,310 sq. ft., the weight of machinery being approximately 2,500 tons.

The armament includes two 9.2-in. guns, sixteen 6-in. guns, and a large number of 12-pounders and automatic guns. The main and auxiliary machinery and boilers and the magazines are protected by a water line belt 11 ft. 6 in. deep, extending over half the vessel's length, and varying in thickness from 6 in. amidships to 4 in. at the ends. At the after end of this belt a 5-in. armored bulkhead is fitted, and 2-in. nickel-steel protective plating is fitted on the bows. Aft the screen bulkhead is a protective



deck 2½ in. thick, affording protection to the steering gear and after capstan, etc. Within the citadel two protective decks are worked, the upper being 1½ in. thick and the lower 1 in. thick. The 9.2-in. guns are protected by 6-in. barbettes, in addition to gun shields. The 6-in. guns are each enclosed in a separate casemate, these being formed of 5-in. hard-faced armor. The conning tower is of 12-in. armor, with an armored tube 7 in. thick, affording protection to the controlling gear, etc.

Turning now to the steam trials, it may be said at the outset that special interest attaches to these, as a change was made in the pitch of the propellers, so as to make possible a comparison of the results with those got with the Good Hope. Both ships are alike in form; the machinery is of the same dimensions, even to the propellers, which are 19 ft. 2 in. in diameter. On the trials of the Good Hope the blades were set at a pitch of 22 ft. 9½ in., and it was decided to give the Leviathan's propellers an altered pitch, which is now 23 ft. 9½ in., and to make observation of the result on the speed of the ship. It was not deemed necessary to make the same series of progressive speed trials as in the case of the Good Hope, and only at three speeds are data available—at 15¼ knots, which represents the rate for one-fifth power; at 22 knots, the speed at continuous steaming power; and at 23 knots. Although at full power there was a slight gain in speed in the case of the Leviathan, the Good Hope did a shade better for the same power at 22 knots. The revolutions of the Leviathan are also slightly less, as one would expect from the coarsening of the propeller pitch.

#### MEAN RESULTS OF SPEED TRIALS OF THE BRITISH CRUISERS LEVIATHAN AND GOOD HOPE.

Revolutions.	Indicated horse power.	Speed in knots.	Percentage of slip.
Leviathan.			
71.2	6,481	15.238	8.5
107.6	22,900	21.96	12.8
122.1	31,592	23.25	18.7
Good Hope.			
77.5	7,953	15.91	8.4
109.1	22,467	22.10	9.6
126.2	31,088	23.05	18.5

The Leviathan's trials at 15 knots speed were made over the measured mile in Stokes bay at the top of the tide, the depth of water then being quite satisfactory for the speed and draught; but the other trials at 22 and 23 knots were made at the deep-sea course between the Dodman and Rame Head. Four runs were made on each occasion. There was a stiff beam wind blowing, and the first and third trips were made to the westward. The mean of means was 23.25 knots.

As to the steam performances of the machinery, little need be said. The boilers worked well throughout, and the full power—the greatest yet maintained in a warship on an eight-hour trial—was got with only .35 in. of air pressure, which is far below the standard formerly set up as natural draught. The loss of water is an interesting feature. On the low-power trial it was 15 cwt. per hour, which for 6,372 I.H.P. is quite satisfactory; at 22,882 I.H.P. it was even proportionately less, being slightly over 3 tons per hour; and at full power it was practically at the rate of 1 ton per 8,000 H.P. per hour, or 4 tons in all per hour. The absence of vibration was also an important point.

#### A BREEZY VIEW OF THE COMBINATION.

The editor of Fairplay of London takes a parting shot at the Morgan shipping combination in the following wise:

"I wonder how those inspired papers, and ubiquitous agencies, feel at the succession of sells that have been put upon them in connection with the passing of the famous White Star line, now that everyone of their numerous predictions has been falsified in the most flagrant manner. I wonder, too, what will be the ultimate fate of those unhappy writers who ridiculed the idea of the sale on the ground that Mr. Pirrie's patriotism alone would suffice to prevent it. And yet all this tommy-rot went down with the public, who tried hard to get their belief to outweigh their fears. Patriotism, it must be remembered, is a matter of sentiment, and Mr. Pirrie has about as much sentiment as a Muscovy duck. Even were it otherwise, he would not have been justified in allowing his own sensitive feelings to stand between the enormous financial interests involved, and the sale to solvent buyers of a number of boats, some with a past, some without, for which in many cases employment had become unprofitable, and a sale impossible, except at about half the price given by the combine. It is more likely in my opinion that Mr. Pirrie has engineered the whole scheme from the beginning—perhaps a good deal more than a year ago—and that he has done so in the interest of Harland & Wolff, who certainly come out on top in the deal, though, if I am not mistaken, bankers on both sides of the Atlantic will hail the scheme. For this he deserves praise, not blame; but don't let us talk about patriotism. It was Mr. Pirrie's duty to protect the financial interests of his partners and supporters, just as it was Mr. Bruce Ismay's duty to protect the interests of his shareholders. Whatever the strength of the patriotic ardor burning in the breasts of these two gentlemen might be, they could have no right to indulge it at the expense of their associates whose money was at stake.

"A rare opportunity offered—or was created—of getting rid of a mixed bunch of ships of all sorts, sizes and ages, at possibly 50 per cent. more than their selling value here, and, like the prudent and far-seeing business men they are, they took it. What I do not understand is the quite unnecessary air of humbug that has been thrown over the affair when it must have been well known that the real truth was so shortly to come out. The chief visible gainer is Mr. Pirrie, who has played the Harland & Wolff hand with consummate skill. The deal has damaged the prestige of the nation, but Mr. Pirrie was not created to look after that; and what we, as a country, have lost on that head the Americans claim to have gained. But there is this difference: our loss of prestige as a nation has been accompanied by a great accession of wealth to the principal agents in the deal. The American national gain of prestige is accompanied by what looks very likely to turn out a loss to the trust which has worked the gain; for at the prices paid for the steamers, and with the picturesque and varied management one may reasonably look for, it is difficult to see how even the American railways are to keep the ball rolling, especially if the freighters in the west should take a hand in the game."

#### A SENSIBLE VIEW OF THE COMBINATION.

The London Statist discusses the shipping combination in the following sensible manner:

"Heretofore American railways favored American shipping, in so far as that shipping was sufficient to carry what traffic they could give. And it is generally believed that they have had in contemplation the starting of new fleets for the express purpose of increasing their own traffic. Now that all the lines in this combination will belong to an American company in which the leading railways, no doubt, will be more or less interested, there will be no object in starting new lines. Presumably, therefore, competition at sea between Europe and America will be materially restricted by this amalgamation. But, it may be asked, what will be the effect upon this country in general? So far as the consumer is concerned he ought to benefit. If, by maintaining rates and reducing working expenses, transportation across the Atlantic can be effected more cheaply than heretofore, there will obviously be a tendency toward a lowering of the prices of all American produce, and European consumers will necessarily benefit thereby.

"It may be objected here that, to the extent to which American production is thus favored, European production will be prejudiced. The first answer to that is, that every improvement in locomotion that has taken place has benefited the more distant producers and been prejudicial, more or less, to the nearer producer. The immense quantities of American grain now imported into Europe could never have reached us if there had been the marvelous construction of railways and steamships witnessed during the past century. The second answer is, that it depends largely upon European producers whether they shall, in fact, be prejudiced. If they are aroused by the remarkable progress the United States is making to improve their methods of working in every way possible, and to secure in every direction real efficiency, there is no reason why they should not hold their own. If, on the contrary, they refuse to take the lesson to heart, they will unquestionably be beaten. But they should have been beaten, in any case, even if the White Star and the other lines had held out. For then the construction of a great American mercantile fleet would have been gradually carried out.

"The real lesson to be learned from this remarkable combination is the urgent necessity for securing efficiency in every department of our national life. It is silly to accuse ship owners who have entered into this agreement of want of patriotism. The whole teaching of the country for more than half a century has been the wisdom of buying in the cheapest market and selling in the dearest. We have all pursued the rule. Even the government itself does not favor the home producer if a foreign producer can supply it more cheaply. There is nothing, then, more censurable in the ship owners selling their ships to foreigners than there is in any other kind of trader selling the commodity in which he deals. And every trader is only too glad to do so."

#### THE ACCIDENT TO THE DEUTSCHLAND.

The Hamburg-American line has found it expedient to issue the following official statement:

"We regret to learn that various rumors have been circulated which grossly exaggerate the damage caused to our steamer Deutschland, and even reflect upon the memory of our honored Commodore Albers. We therefore herewith give the facts, which are as follows: The Deutschland sailed from New York April 17 and on April 19 encountered a hurricane from the northwest which lasted four days. On April 22, when 400 miles west of Lands End (England), she lost her rudder, the wrench, as later investigation in the dry dock revealed, injuring her sternpost. Capt. Albers successfully completed the voyage to Plymouth, Cherbourg and Hamburg without rudder, steering by means of the twin screws. Upon entering the port of Cherbourg, Capt. Albers had an attack of heart failure, but quickly recovered and yielding to his sense of duty again mounted the bridge. He made the run to Cuxhaven in good time, and thence proceeded with his ship to Bremerhaven, where the Deutschland was docked and the extent of the damage determined. The Deutschland then went back to Cuxhaven and it was after safely reaching that port again that Capt. Albers suffered the attack of heart failure which ended his life. True and brave to the last, he died at his post. All honor to his memory. The damage to the Deutschland is confined to the loss of the rudder and breaking of the sternpost, which have to be replaced. The casting of a new sternpost and of a new rudder frame takes months, and mounting and refitting them require no less than five months in the dry dock. It must be borne in mind that the sternpost and rudder are steel pieces of great weight, the former weighing about 38,000 lbs., the latter about 27,000 lbs. The shaft of the rudder is 2 ft. in diameter. It is difficult to obtain for so long a time one of the few dry docks in existence capable of accommodating a ship of the size of the Deutschland. This explains why it will be impossible to put this steamer into commission during the present season."

S. E. Guild of Boston has chartered the steam yacht Stellar for the coming season through the office of Frank N. Tandy. This yacht is owned by Truman Beckwith of Providence, a member of the New York Yacht Club. She is 75 ft. over all, 64 ft. water line, 12 ft. beam, and 5 ft. draught. George Lawley designed and built her in 1893. She has very good cabin accommodations, and Mr. Guild will use her for cruising along the New England coast. Mr. Tandy has also chartered the steam yacht Clara to Mr. Robert Bacon. The Clara is 98 ft. over all, and was built by Herreshoff in 1897.

The senate naval committee has made a favorable report authorizing the president to transfer Naval Constructor Richard P. Hobson to the retired list of the navy on account of disabilities incurred in the line of duty. Mr. Hobson recently applied for retirement on the ground that his eyes were affected, but the naval board which examined him reported against such action. Hobson thereupon appealed to the president, who transmitted the application to congress with a favorable recommendation.

It is said in yachting circles that Sir Thomas Lipton has decided to challenge for the America's cup in 1903. William Fife, Jr., will design the boat, which will be built by Denny Bros.



## OIL ENGINES IN LIGHT MARINE WORK.

### ADVANTAGES AND DEFECTS OF OIL MOTORS FOR MINOR MARINE WORK—REVERSING MOTORS AND REVERSING GEARS.

Capt. C. C. Longridge recently read a paper before the Society of Mechanical Engineers of London upon the subject "The Application of Oil Engines to Light Marine Work." Of the advantages and defects of oil motors for marine work he says:

"It seems probable that the large and increasing use of the oil motor for road locomotion will be followed by its increased application to light marine work. As a propelling agent for launches, or as auxiliary power for somewhat heavier craft, the advantages of the oil engine are sufficiently obvious. It is compact, thus providing greater accommodation. It weighs little and stands low, thus securing stability and buoyancy, the comfort and safety of which, in a seaway, have only to be experienced to be fully appreciated. Cleanliness of action also, readiness to start at any moment, and the little supervision required, and that not of the skilled nature needed by steam, are claims of the oil engine, which are sure to force it into favorable notice. It may be added that, with most ordinary precautions, the oil motor is safer than the steam engine. This is undoubtedly true. Even the petrol motor, where electric ignition is used, is absolutely safe, and the most timid passenger may sit with a perfect sense of security against fire where this method of ignition is adopted. In the past, carelessness in the use of ignition lamps, and defects in the motors themselves, gave a bad name to oil engines. But the source of danger has been removed, and the mechanical defects have been overcome, and these engines are now both safe and reliable. It must not, however, be thought that every objection to their use for marine work has been removed. A great defect inherent to the majority of such motors, that of running only in one direction, still remains. To meet this difficulty a number of expedients have been devised, and merit consideration by those proposing to adopt oil as a motive power on the river or at sea."

Upon the subject of reversing motors and reversing gears, Capt. Longridge says:

"In a comparatively few cases the difficulty has been boldly grappled by designing motors to reverse and run in either direction. This, in most cases, involves the duplication of valves and other complication. The facts, however, that no reversing motor appears to make headway in the market, and that the best known makers still adhere to motors running only in one direction, indicate that manufacturers consider the additional complications not worth the advantages gained, and that the same result is better attained by other expedients. Among these are:

"Reversing Gears.—These comprise methods by which a change in the direction of running is effected by a mechanism entirely within the hull. These methods may be classified as friction, countershaft, and tooth-wheel gears. A typical instance of the former is the system of friction wheels, for a long time adopted by the Daimler Motor Co., Ltd., for their launch motors. Motion ahead was given by a friction cone engaging with the flywheel. To reverse, this cone was withdrawn, and a reverse driving-wheel was actuated by two side friction wheels pressed by a hand-lever against the engine flywheel. An illustration and description of the system may be seen in patent No. 14,034 of 1886 by G. Daimler. For small powers this method is simple and fairly satisfactory. But, as the writer has experienced, there is always risk of slip and failure to reverse at a critical moment. For engines of anything about three brake horse power such a combination of friction wheels is cumbersome and ill-adapted. Under friction may be included belt gear for reversing. This system, too well known to need description, was also employed by Daimler and others, but is now quite obsolete. As instance of methods of reversing by the use of a countershaft may be cited patent No. 21,858, taken by Winckler in 1892. The propeller shaft is in line with the engine shaft, and for forward running, is driven from it through a clutch. For reversing, a countershaft driven from the crankshaft through spur gearing drives the propeller shaft through friction gearing, which is thrown in and out of action by the same lever which actuates the clutch.

"To the simple reverse is sometimes added a variable speed gear, as in Messrs. Weyman, Hitchcock & Drake's patent, No. 22,797 of 1892. More positive, and therefore more reliable, methods of reversing are supplied by the use of gear in place of friction wheels. The destruction of the teeth on intermeshing to reverse is prevented by interposing a spring clutch or twisting rope appliance, by which the shock is absorbed. This latter appliance has been employed by Mr. Hilliers of Ramsey for small petroleum launches. In 1892 Mr. S. Griffin described in patent No. 4,208 a reversing gear with bevel train, but all gearwheel reversing arrangements, where wheels are always in mesh, have the disadvantage of being noisy. For this reason the more suitable combinations are those in which the whole rotate solid when running ahead, the gear wheels acting only when the motor is reversed. A neat arrangement of this class has been lately patented by Mr. Crawford of Coventry. It consists of friction cones combined with spur gearing. Primarily designed as a light car change-speed gear, it is stated to be equally adaptable to launch work. It is said to have been used on boats by Messrs. Simms, but the writer has no information as to actual working results.

"Another arrangement falling under the head of friction devices is that described in P. W. Willan's patent, No. 3,749 of 1888. On the engine shaft is an internally-gear wheel, which is in gear with a number of pinions or studs, carried by a disc mounted loosely on the propeller shaft. Into this disc fits a friction cone keyed to the shaft and capable of end motion. The engine shaft rotates the propeller shaft in the same direction as itself, when the vessel is going ahead, and thus the friction cone is held in gear. To reverse the propellers the disc is held by a brake strap, so that the shaft is rotated in the reverse direction through the pinions. Messrs. Tolch of Fulham advertise a reversing gear in which the gear wheels are locked and revolve with the shaft as one whole when going ahead, and are in gear only when going astern. This is a commendable method, and for motors of high power there is no question that its use in one or other form is preferable to—

"Reversing Propellers.—For the small power motors used in launch work, by far the most popular method of stopping, going ahead or astern, is the reversing or feathering propeller. On account of its easy manipulation, the complete gradation of speed, and its absence of noise, it is de-

servedly a favorite device. The principal methods by which feathering is effected are crank or link motion, bevel or worm gear, rack and pinion, eccentric pins, sliding blocks, etc. Although reversing gears and feathering propellers are the more usual methods by which the non-reversibility of marine oil motors is remedied, there is still another system, termed—

"Bi-Unial Propellers.—This device consists of two ordinary screw propellers of right and left-handed pitch respectively, the forward propeller being mounted on the end of a hollow shaft, which extends into the interior of the boat. Through this hollow shaft a second shaft passes, on the end of which is mounted the backward propeller. Both propellers are thus free to revolve independently of each other. The propeller shafts may be driven either by bevel gearing, as in the patent 17,012, 1891, of Messrs. Boisset and Mercier, or by a clutch, as in patent 19,162 of 1893, by S. Griffin.

"In the bi-unial propeller now sold by the Griffin Engineering Co., Ltd., a double friction clutch attached to the engine shaft, and actuated by a hand lever, is connected with the end of these shafts in the interior of the boat, the arrangement being such that either of the propellers may be engaged with the engine, or both may be simultaneously disengaged. It will thus be seen that by a motion of the hand lever, the whole operation of starting, stopping, or reversing the boat are effected without stopping or reversing any part of the driving mechanism; and owing to the absence of tooth gearing or racks, the action is noiseless and free from jerk or shock. It is stated that, from experiments made, no difference either in speed or oil consumption could be detected, over a measured distance, with an idle propeller free to revolve, or with the propeller removed. The writer feels somewhat sceptical as to the absence of loss of power due to the obstruction of the blades, and the rotation of the idle propeller with its length of sleeve or shaft.

"Range of Horse Power in Marine Motors.—One of the most significant signs of manufacturers' belief in the future of marine oil engines is the wide range of horse power for which they now design motors. The Daimler Motor Co., Ltd., of London and Coventry advertise petrol marine motors ranging from 3 to 60 brake horse power; Messrs. Tolch of Fulham also offer marine motors from 1 to 60 H.P.; while the Griffin Engineering Co., Ltd., are prepared to supply marine oil motors up to 100 effective horse power. Among the users of the more powerful motors are yacht owners seeking auxiliary power, and sailing trawlers suffering in competition with steam trawlers. Among the latest additions to the users of marine oil motors is the war office, for which a powerful petrol-driven launch has been lately constructed by the Daimler Motor Co., Ltd.

"Dimensions and Weights of Marine Motors.—For purposes of comparison, and for the use of the reader, the following table, giving dimensions and weights of some of the various marine oil motors now on the market, has been compiled by the writer:

DIMENSIONS AND WEIGHTS OF VARIOUS MARINE OIL MOTORS.

Brake Horse Power	Makers.	Over all Dimensions.			Weight.	No. of Cylinders.	No. of Revolutions.	Oil Used.
		Length.	Width.	Height.				
		ft. in.	ft. in.	ft. in.	cwt. qr. lb.			
3	Daimler Motor Co.	2 8	1 8	2 4	1 3 11	2	750	Petrol.
3	Tolch & Co.	2 9	2 1	3 7	9 2 0	1	350	Kerosene
5	Griffin Eng. Co.	3 9	2 3	4 0	15 0 0	2	.....	Kerosene
6	Daimler Motor Co.	1 9	1 6	2 2	2 1 4	2	750	Petrol.
6	Tolch & Co.	3 11	2 1	3 8	13 2 0	2	350	Kerosene
8	Daimler Motor Co.	1 9	1 6	2 2	2 1 4	2	750	Petrol.
8	Tolch & Co.	4 1	2 4	4 0	21 0 0	2	320	Kerosene
8	Griffin Eng. Co.	4 1	2 10	4 3	22 0 0	2	.....	Kerosene
10	Daimler Motor Co.	1 11	1 6	2 3	2 2 4	2	750	Petrol.
10	Tolch & Co.	4 4	2 7	4 5	22 2 0	2	290	Kerosene
10	Griffin Eng. Co.	4 6	3 1	5 2	27 0 0	2	.....	Kerosene
20	Daimler Motor Co.	2 10	1 10	2 7	4 0 12	4	750	Petrol.
25	Tolch & Co.	5 3	3 7	5 9	52 0 0	2	250	Kerosene
25	Griffin Eng. Co.	5 8	4 8	6 10	45 0 0	2	.....	Kerosene
30	Tolch & Co.	5 8	3 11	6 10	63 0 0	2	240	Kerosene
32	Griffin Eng. Co.	6 0	4 3	6 10	55 0 0	2	.....	Kerosene
35	Daimler Motor Co.	3 10	2 0	3 0	5 0 0	4	750	Petrol.

"The above table is sufficient to show that, power for power, the Daimler petrol engine, in compactness and lightness, stands far in advance of the kerosene engines. As an almost necessary consequence, the petrol motor is also in first cost lower than the others. As regards running costs, the motors are probably much on a par, for, although petrol is dearer than kerosene, the heavy oil engine involves more deadweight, decreases the boat's carrying capacity, and is likely to cost more in lubrication.

"Petrol and Kerosene.—As regards comfort and safety, the writer favors petrol. Unlike kerosene, petrol does not leave grease where it is spilt. It evaporates so quickly that the substance it touches does not remain inflammable, as is the case with the heavier oil. When kept in common receptacles, it is safer than kerosene, because the vapor in the can is too rich to easily explode, which is not always true of the vapor in a vessel with kerosene; lastly, petrol will burn a considerable time before it does more than char the substance on which it is lighted. For this reason, and especially where electric ignition is used, the yachtsman and the seaman may rest assured that, where the most ordinary precautions are followed, there is no risk of fire due to the use of petrol."

Several large freight steamers, built and building for the Boston Tow-boat Co. and the Boston Steamship Co., will be operated in a new line across the Pacific. The line will run between Seattle and the Philippines, with a branch at Vladivostock and the Russian-China ports of Port Arthur and Chamulpo, Korea. The principal ports of Japan and China, such as Yokohama, Kobe, Shanghai, Tientsin and Hong Kong, are included in the main route. Frank Waterhouse & Co. of Seattle, Wash., will act as general agents. The enterprise is backed financially by Kidder, Peabody & Co. of Boston, Alfred Winsor, president of the Boston Steamship Co., and other capitalists. The vessels constituting the fleet are the Tremont, Shawmut, Lyra, Hyades and Pleiades. The Tremont and Shawmut were recently launched from the yards of the Maryland Steel Co., Sparrow's Point, Md. The Lyra is now en route to the Pacific and the Hyades and Pleiades are already on the Pacific. For the present the line will be conducted for freight purposes only.



## NO COMFORT FOR ENGLAND.

GLOOMY VIEWS OF THE SHIPPING COMBINATION FROM ENGINEERING, ONE OF THE LEADING SHIPPING JOURNALS OF LONDON—A BLOW TO BRITISH SHIP BUILDING.

Engineering of London has been discussing the pros and cons of the shipping combination for the past month, but is gradually finding more cons than anything else. It sees no good whatever in the combination to British interests. In its latest issue it says:

"In regard to the control we have over the White Star ships, Mr. Morgan, who will direct movements, may well claim that we have not even a moral hold upon him. As an American citizen not only is he debarred from making an agreement with our government for warlike purposes of this nature, but he is, by our law, even prevented from owning a ship sailing under the red ensign, unless in virtue of being a shareholder in a limited company. Our law in this respect, as Mr. David Pinkney has pointed out, is anomalous, and needs reconstruction. As a matter of fact, there are many ships flying the flag which are practically owned by foreigners, and the earnings from which go into foreign pockets. The value of the properties is not revealed, but the White Star and Dominion lines are to be assessed at ten times the net income of the year 1900. The nominal value of the property will be vastly different from the original value, and dividends will have to be earned on this increase. It is said that this will be possible from more economical working; but surely, if this can be done, a combination of British ship owners, with the unrivalled experience such a body would possess, could have better accomplished the task. Perhaps the most depressing incident in the whole business is the handing over of the famous Belfast ship yard to American interests. We can afford to part with our ships to foreign purchasers; we have been doing it for years with advantage, and so long as our ship yards and engine works remain free and unfettered, we can build newer and better vessels to fill their places. Messrs. Harland & Wolff undertake not to build for any other ship owners than the parties to the contract (the new American corporation), provided the latter keep the works fully employed; but in any case the builders are not to accept orders from parties who are competitors of the purchasers in any trade at the time carried on by them without first obtaining the purchasers' consent; but this proviso is not to prevent the builders accepting orders from the Hamburg Americanische Packetfahrt Actien Gesellschaft. In return the corporation undertakes to place 'all orders for new steamers or heavy repairs and alterations that they require at a ship yard in the United Kingdom. Nothing, however, shall prevent the purchasers from placing orders for new steamers or heavy repairs or alterations, re-boiling or re-engining, at ship yards in the United States.'

"The arrangement is to last for ten years, unless terminated at the expiration of five years in virtue of notice from either party. It is not easy to understand what influence can have been brought to bear to induce any ship building firm in the United Kingdom to become a party to such an arrangement. That it is a blow aimed at British ship building is apparent on the face of it, and it is difficult to see clearly how even the firm in question secures a certain benefit. It is common knowledge that the ambition, laudable in itself, of American business men has led them to re-establish the prosperity of the ship building industry, which was virtually lost when iron took the place of wood as a material for construction. With the enormous advance in steel production which has been the chief industrial characteristic of the United States, it was thought that ship building would necessarily follow; but a protective tariff, which accomplished so much for the steel maker, was unable to do the same for the ship builder, whose productions had to meet competition outside the fiscal zone. This has been a sad blow to American ambition, but it is hoped that by aid of bounties and combinations the end may yet be reached within a period that is variously estimated at from five to ten years. In the meantime the plain fact remains that Mr. Morgan has managed to shut one of the largest and best equipped yards in the country to British-owned ships which can be brought into competition with him; though he leaves the door open to our other rivals, the Germans. If, however, American ship building can be sooner established than at present appears probable, he is quite at liberty to leave his Belfast friends in the lurch, or, at any rate, only give them such business, in the shape of repairs, as must necessarily be executed in Great Britain. So far as appears nothing prevents him from going to continental ports.

"We have no belief in legislative assistance to meet fair competition from abroad if private enterprise fail. If foreign countries have natural advantages we do not possess we had better abandon the field to them and turn to more promising spheres of activity. But it is not here a question of fair competition or natural advantages; it is a gigantic and unfair attempt to strangle a flourishing industry by the aid of an unnatural combination. The fine promises and beautiful sentiments about the welfare of the people at large, which the organizers of trusts have stereotyped in America, cannot disguise the fact that a monopoly, once obtained by a combine, will be used to squeeze as much from the consumer as he will yield, and the avowed object of Mr. Morgan is to control the Atlantic trade. If English people believe that Mr. Morgan and his followers are risking their millions for philanthropic purposes they must be foolish indeed. There will be, if the combine is formed, the usual 'freezing' process until opposition is choked, with the inevitable reaction which will last as long as monopoly is complete. Beyond this there is the possibility that a large part of the Atlantic commerce will be diverted directly to the continent, in spite of the German agreement, the details of which are unknown, excepting that it is stated that the German emperor, who is largely interested in German shipping, vetoed the Americanizing of the German fleet.

"Under these circumstances, and seeing the weapons our rivals are using against us, we cannot help sympathizing with the suggestion put forward by Lord Charles Beresford, that substantial encouragement should be given by the state to a Canadian line. Of course, the traffic to our American colony does not approach that to the United States, but still the intercourse is considerable, and a very great deal passes through New York owing to the superior character of the steamers. This, at least, might be saved to us. Bounties, no doubt, are not our way; but we are every day learning that 'our way' is not necessarily the most efficient way.

There are a good many things we have yet to find out; some that others have even found out before us. The Russians have established an important line of steamers that would never have sailed under their flag without substantial state aid. Probably the volunteer fleet does not pay as a matter of balance sheet; doubtless the work it does could have been more cheaply performed by contracting with British ship owners; but there is no doubt that it would be a valuable acquisition in war time, and the indirect benefit that follows the possession of the ships may possibly more than counterbalance the extra freight. At any rate, if the Russians continue to develop their steel industry, they will find an outlet for the product in the building of ships for which work will be ready provided. Menaced as we are by competition, it is also worth considering whether some of the millions we provide annually for the navy cannot be usefully spent in assisting the mercantile marine. The work done by cruisers in war time would not be very different to that carried out by fast liners. The American naval attaché, Capt. Clover, recently stated at a meeting of the Institution of Naval Architects that the mercantile cruisers were the most useful ships for scouting, and the Americans are the only people who have had practical experience in such work. Our own naval officers—as a rule—are opposed to the principle of mercantile auxiliaries; but naval officers are opposed to most things that are not strictly 'service' and according to tradition.

"After all, however, the chief weapon by which we must fight foreign competition of the sort now threatening must be the combined activity and resource of our own ship builders, our ship owners, and our freighters. If we lose the ships we must build better ones, and when one owner, or one constructor, makes terms with the enemy, we must hope for two better men in his place. If one ship yard is cut off from us we must further develop others, and do so on the most modern lines, so that we may not be losers by the course of events. It is said that it is hopeless to expect to control the Atlantic trade, because the bulk of the freight is from west to east; that the American manufacturer is the exporter, and thus rules the market. But if the American is the seller, we are the purchasers, and the customer can always have the last word as to the dispatch of goods if he choose to exercise his power. It is quite possible the legislature might give some assistance here—for combinations among importers would be a difficult, though not impossible, thing to arrange—without raising the bogey of protection. Hitherto our laws have been framed to harass and shackle shipping enterprise. After our modern parliamentary practice the legislature has put the burden on ship owners simply because they represent capital and are numerically weak in regard to votes; they do not command the mob, for the 'man in the street' has yet to learn that all comes out of the pocket of the consumer at last."

## SHIP YARD NOTES.

Roach's Ship Yard, Chester, Pa., has secured a contract to build another steamship after the model of the City of Memphis for the Ocean Steamship Co. of New York. The new steamship will be for the line between New York and Savannah, Ga. She will cost approximately \$500,000. Her dimensions will be: Length over all, 392 ft.; beam, 49 ft.; depth of hold, 27 ft. She will have four steel decks with a freight capacity of 3,500 tons on a draught of 18 ft. 6 in. She will be equipped with a triple-expansion engine with cylinders of 24, 46 and 75 in. diameter, supplied with steam by four single-ended Scotch boilers, 14 ft. 9 in. by 10 ft.

It has been decided to rig the seven-masted schooner Thomas W. Lawson before she is launched from the Fore River ship yard at Quincy Point, Mass. As each of her steel masts weighs 17 tons without rigging and 20 tons when completely fitted, she will have a somewhat unusual weight aloft for launching, and special preparations are being made for getting her into the water. The Lawson's wooden deck is now being laid and two of her boats—one a 30-ft. gasoline launch—have arrived at Fore River. She will probably leave the ways about the middle of July.

It is reported that the Dartmouth Steel Ship Building Co. has been organized to carry on ship building at Dartmouth just across the bay from Halifax. It takes over the plant of the Nova Scotia Iron Works and gets bonuses from the town of Dartmouth and the province of Nova Scotia. The capital is principally American and the officers are: Edward Griffith, president; Ozias G. Plummer, treasurer; and Herbert R. Jones, secretary.

The North Shore Railroad Co. of San Francisco has given a contract to the Risdon Iron Works, San Francisco for a steamer of the following dimensions: Length over all, 251 ft.; length between perpendiculars, 231 ft.; beam, 38 ft. The engine will be of the single cylinder, surface-condensing, walking-beam type, and the steamer will be expected to make 16 knots per hour. She will be christened the Cazadero.

At Weaver's Ship Yard, Orange, Tex., work is progressing rapidly on two big oil barges for the Higgins Oil & Fuel Co. of Beaumont. One barge is 156 ft. over all, 31 ft. beam, and 11 ft. depth of hold. The second barge measures 185 ft. over all, 33 ft. beam, and 15 ft. depth of hold. The first has a capacity for 7,000 barrels of oil and the second for 10,000 barrels.

The new steam pilot boat New Jersey was launched last Saturday afternoon from the ship yard of A. C. Brown & Sons, Tottenville, S. I. Her dimensions are: Length, 155 ft. over all; 132 ft. on the water line; 28 ft. beam, and 13 ft. draught. She is fitted with a fore-and-aft compound engine.

As soon as the four-masted schooner now on the stocks at the yard of the McWhinney Ship Building Co., Aberdeen, Wash., is finished another large wooden vessel will be started. Ship owners in San Francisco and Aberdeen have taken a three-fourths interest in the new vessel.

The torpedo boat De Long, built at Lawley's ship yard, Boston, had her trial trip over the measured course last Saturday. Her best speed was 25½ knots, which exceeded the requirements.

It is reported that the Great Northern Steamship Co. has decided to build three more steamships for the Oriental trade between Seattle and China.

Capt. A. J. Slocum of New Bedford, Mass., has just closed a contract with William E. Rodgers of Bath for a four-masted wooden schooner.



### PROGRESS OF MARINE ENGINEERING.

Mr. W. M. McFarland, now with the Westinghouse companies, but who was until a few years ago one of the foremost engineers of the United States navy, has just concluded in the Engineering Magazine a series of very interesting articles on the "Progress of Economy in Marine Engineering." Discussing briefly in the final article such subjects as auxiliary machinery, the steam turbine, etc., Mr. McFarland says:

"A point of difference between naval and merchant steamers is in the auxiliary machinery. For convenience in handling the main engines, which is of vital importance in a war vessel, all the auxiliaries of naval vessels are independent, while in all of the smaller merchantmen, and in some quite large ones, all such auxiliaries as the air pump are worked from the main engine. Most of these independent auxiliaries, for simplicity and convenience, have hitherto been operated almost entirely by simple engines using steam with scarcely any expansion, and even where the air pumps have had compound engines the speed is so slow that the economy is very low. At maximum powers the steam and coal expenditure for the auxiliaries is not of so very great importance, but at cruising speeds the percentage of the total coal expenditure due to the auxiliaries rises to a very appreciable figure. Prof. Hollis of Harvard University, in a lecture before the Naval War College (in 1892), while he was still an officer in the navy, gave some very interesting data on this point with respect to the machinery of the United States steamer Charleston. From these it appears that when the main engines were working at half power the coal for auxiliaries was 21 per cent. of the total coal used, while at one-eighth power, for ordinary cruising, this percentage had risen to 34. One of the methods proposed for making the auxiliaries more economical is to deliver their exhaust to one of the receivers of the main engine, from which it can be used economically in the other cylinders, and an extension of this principle is to have the auxiliaries take steam from the first receiver and exhaust into the second, which would make them in effect a part of the intermediate cylinder of the triple-expansion engine. My attention has been called to saving of some five or six tons of coal per day on one of the large American cruisers, due to turning the exhaust of the auxiliaries into the low-pressure receiver, when the total coal used was some sixty tons per day. Another method of securing economy is to have the exhaust from the auxiliaries pass through a feed-water heater, and this method has been adopted in some of the later ships.

"So far as can be seen at present, it would appear that the simplest and most economical method of operating the auxiliaries which are actually in the engine and fire rooms is by steam, although, as has been noted, in the past these auxiliaries have nearly all been simple engines, and there may be cases where they could be compounded to advantage. For the auxiliaries outside of the machinery compartments, electric driving has been seriously considered, and in some cases has been tried with considerable satisfaction. The experience with electric transmission on shore would indicate that this method of driving the outside auxiliaries ought to give great satisfaction, both on the score of economy of operation and the avoidance of long leads of steam and exhaust pipes through living quarters and other places where they are undesirable. Thus far the electric machinery installed on board ship has been exclusively of the direct-current type, as the electric experts in the navy have been remarkably conservative. The present practice on shore for power plants is almost entirely to use the alternating current with induction motors, and these seem peculiarly adapted to the conditions on board ship. When some navy shall have been sufficiently progressive to use these motors and give them a thorough test, it seems probable that it will lead to their general introduction. The remarkable simplicity of induction motors and their ability to withstand rough usage and neglect make them particularly adapted for use in situations where their manipulation would fall into the hands of people who are not trained mechanics, as is the case with the deck force on board ship.

"A subject which is of great interest to all who study marine economy is the use of liquid fuel, and it is appropriate in these articles to discuss this subject briefly. It is well known that crude petroleum is not adapted to use on board ship on account of its containing volatile constituents, which at moderate temperatures are given off, and which involve serious danger because some of them form explosive compounds. Under special circumstances the use of crude petroleum might be permitted, but certainly on naval vessels it is entirely inadmissible. The refuse which remains after the distillation of the crude petroleum is, however, perfectly safe, and it resembles in appearance and some properties the oil used for cylinder lubrication. This refuse has a high calorific value, giving about 21,000 thermal units per pound, which is about one and a half times the calorific value of the best steam coal. Notwithstanding the lower density of the oil, the fact that there is absolutely no waste in stowage enables about the same weight of oil to be stowed in a given space as of coal. To burn this refuse successfully it has to be sprayed, or atomized, either by a jet of steam or by the use of compressed air, and under moderate rates of combustion it gives highly satisfactory results, as the combustion is complete and there is neither refuse nor smoke. The reduced personnel required to handle boilers with fuel oil, and the ease and cleanliness with which it can be taken on board, all tend to commend it very highly. Under existing conditions there are, of course, the objections to the use of liquid fuel that it can be obtained in only a few places, and that any attempt to use it on a large scale would probably raise the price to such a degree as to make its use very much more expensive than that of coal. Some years ago one of the great American railroads was considering the use of liquid fuel for trains running through thickly populated districts. Experiments showed that, as far as manipulative considerations were concerned, it was a great success; but when the question of the amount to be used came up it was found that if this road had attempted to use petroleum refuse alone, it would have taken up nearly the entire amount available in the United States at that time. Notwithstanding these considerations, the obvious advantages of liquid fuel have made it seem peculiarly adapted to use on torpedo boats, and during the last few years Admiral Melville has been carrying out experiments to decide the question and to find by actual practice just what advantages would accrue. It may not be amiss in this connection to remark that, on the whole, the simplest method of spraying the oil is by the use of steam, and that this is entirely practicable in spite of the commonly held opinion that sea-going vessels could not afford to spare the fresh water required. The Italian experiments of about 1892

demonstrated that the steam required for spraying is less than 2 per cent. of the amount evaporated in the boilers, so that evaporators to make up the necessary amount of fresh water would weigh less than the air-compressing machinery which would be necessary if air were used for spraying. The preliminary experiments on the torpedo boat Stiletto, at moderate powers, were very promising and enabled an excellent form of atomizer to be thoroughly tested. After the close of the Spanish war the experiments were resumed upon a small sea-going torpedo boat called the Talbot, but when the effort was made to get as good results as had been obtained with coal, a difficulty was encountered which had developed in previous experiments with liquid fuel, namely, that, as far as experience has gone, it seems impossible to get as great a power out of a given boiler plant with oil fuel as can be obtained with coal. Admiral Melville states in his report for 1900 that the highest power obtainable on the Talbot was only about three-fourths of that obtained with coal, and this last for only a short time. There was also another serious objection which had not been anticipated, namely, that at this power there was a great deal of smoke. It thus appears that, in spite of its many promising features, liquid fuel is not likely to play any large part in marine engineering. It has long been used on the steamers of the Caspian sea, which are near the Baku oil fields, and it is quite likely that steamers which operate near the newly-developed oil fields in Texas may also use it, but it does not seem possible that it can play any large part.

"Any series of articles treating of marine machinery would be incomplete which did not make some mention of the new motor which is attracting so much attention, and which at last has been applied to a commercial vessel, namely, the steam turbine. This invention of the Hon. C. A. Parsons of England has been developed by that gentleman from a light but extremely wasteful engine to one which compares in economy very favorably with all but the most economical engines of the ordinary type. For marine purposes it was first used in a little vessel of the torpedo boat class, called the Turbinia, in 1897, and the results there obtained in the way of enormous speed for such a small hull and great power on light weight were so phenomenal that two larger vessels—the Viper and Cobra—were afterwards built to give it a further test. The Turbinia was only of 44.5 tons displacement, and there were three shafts driven by three turbines, each of the shafts carrying three propellers in tandem. The revolutions were 2,100 per minute, and the horse power developed 1,576. The Viper and Cobra had four shafts with two propellers on each, and the aggregate horse power developed was about 11,000. The steam pressure was 165 lbs. and the revolutions about 1,050 per minute. There were two sets of compound steam turbines for driving the vessel ahead, and special smaller turbines were provided for driving the vessel astern. The speed obtained by these vessels, which were of 370 tons displacement, was about 37 knots, which is considerably higher than the maximum speed attained by any vessel driven by ordinary engines. It is, of course, somewhat difficult to get exactly the horse power of these engines, as the ordinary indicator cannot be used and the horse power has to be estimated from the known results in similar vessels driven by ordinary engines. In America the Westinghouse Machine Co. is building these turbines for driving electric generators, and experiments have been made on some turbines of more than 400 horse power which showed a steam consumption of 18.8 lbs. per kilowatt hour, which, by allowing for the known efficiency of the generators and for the usual efficiency of good engines of the ordinary type, would be equivalent to 14 lbs. per indicated horse power in an ordinary engine. These results are for full-power conditions. At half power the steam consumption had only increased to 20.7 lbs. per kilowatt hour, or, as already explained, 15.4 lbs. per indicated-horse-power hour.

"The firm of William Denny & Bros. of Dumbarton, Scotland, who are well-known for their great progressiveness, have recently built a vessel called the King Edward, which is an excursion steamer for plying on the Firth of Clyde, and which is the first commercial vessel to be fitted with turbines. While no reports of specific tests of the performance of the King Edward have been published, the comparative statement given below of the performance of the Duchess of Hamilton and of the King Edward gives a good idea of the economy of the turbine:

COMPARATIVE STATEMENT OF SPEED, MILEAGE AND COAL CONSUMPTION OF THE PADDLE STEAMER DUCHESS OF HAMILTON AND THE STEAMER KING EDWARD.

	Duchess of Hamilton.	King Edward.
Total coal .....	1758 tons 13 cwt.	1429 tons 16 cwt.
Miles run .....	15,604	12,116
Miles per ton .....	8.87	8.47
Number of days running..	111	79
Daily average consumption	15 tons 17 cwt.	18 tons 2 cwt.
Average speed .....	about 16½ knots.	about 18½ knots.

"The Duchess of Hamilton is one of the crack boats on the Clyde, so that her performance may be considered as representative of excellent economy for machinery of the ordinary type. We have not the data of the dimensions of the two vessels at hand, but if they were of about the same displacement the increased speed of the King Edward would justify an increased expenditure of 40 per cent. in coal. As a matter of fact, the increased coal expenditure is only about 14 per cent., thus showing a decided economy for the steam turbine. The performance of the King Edward has been so satisfactory that it has been decided to build another boat of the same type, although somewhat larger, her length being 20 ft. greater and her speed 21 knots. The Parsons Marine Steam Turbine Co. has also on hand at the present time turbine machinery for three high-speed yachts, the largest of which is for Mr. A. L. Barber of New York, and is to be of about 1,400 tons, yacht measurement. The turbines will develop 3,500 horse power. It is most unfortunate that both the Viper and the Cobra were lost at sea before there had been time to gain experience with their machinery under the conditions of regular service, but it is interesting to note that the Parsons company are building another destroyer which will have about the same speed as the Viper, but which is designed to have a superior performance to hers in regard to coal consumption at cruising as well as at higher speed.

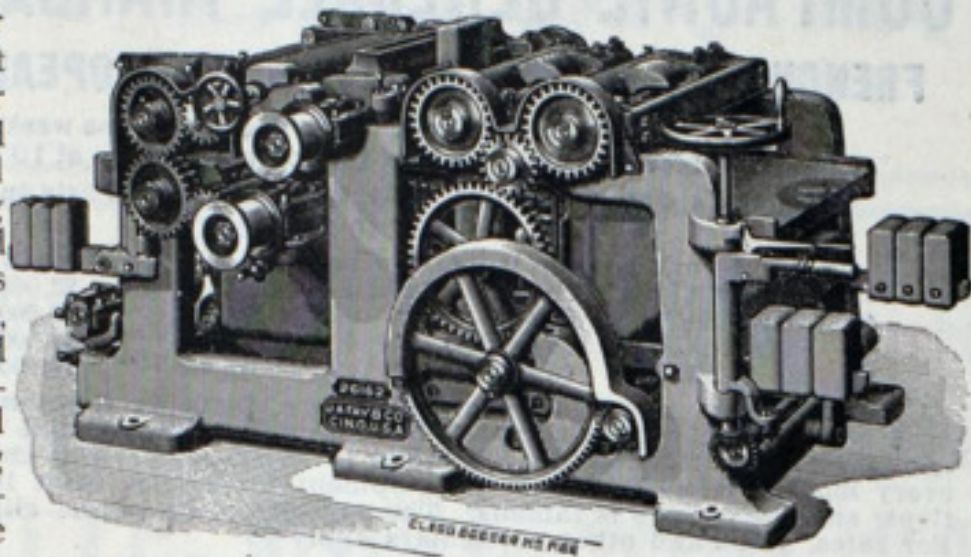
"The advantages of the turbine are the reduced weight of machinery due to the very high rotational speeds, the reduction of vibration, the smaller amount of space required, and the relatively small attention needed for adjustment. A further advantage is the complete immunity from any danger due to priming, or carrying over of water from the boilers,



although in modern engineering this is of very infrequent occurrence. Mr. Parsons has devoted great engineering ability to the development of the turbine, and he believes that it is destined ultimately to supplant the ordinary type of engine. Whether this will prove true or not, the remarkable successes of the boats in which it has been fitted make it worthy of very serious consideration."

#### DOUBLE CYLINDER PLANER AND SMOOTHER.

Readers of the Review will be interested in the machine illustrated herewith. The makers say it is the best double-cylinder smoothing planer ever built for general surfacing, and the fact that it is meeting with success wherever in use seems to bear out their claim. It is designed for general work, and is suited to all wood working shops, mills and factories. It was patented Dec. 19, 1899, Feb. 6, and May 8, 1900. Attention is invited to the following claims for the machine made by the manufacturers.



1. It is made to plane 26 to 42 in. wide and to 6 in. thick. The table is raised and lowered on ball bearings and controlled by hand wheel convenient to operator, and is quickly adjustable for different thicknesses.

2. The feed is six powerfully-driven rolls, four of which are placed before the cutting cylinders and the other two after them, so that each piece of material is fed clear of the cutters. The patent upper feeding-in rolls are center-gearied with gear driven downward. All upper rolls have sectional weights for nicely regulating the pressure. The upper feeding out roll raises parallel for difference in thickness.

3. The variable feed changes from slow to fast, or vice versa, while the machine is running, is always under control of the operator, and can be furnished with any feed desired. It is reliable, simple in construction and efficient in operation.

4. The lower cylinder and receiving plate after same draw out for sharpening knives, and provision is made for insuring uniform thickness, and for surfacing thin lumber. The machine can be fitted with a sectional pressure bar for feeding several narrow pieces of uneven thickness at the same time.

The makers, J. A. Fay & Egan Co., of Nos. 325 to No. 345 West

Front street, Cincinnati, O., will willingly send further particulars, terms and cuts on demand, and also their new catalogue of wood-working machinery.

#### ISTHMIAN CANAL BILL IN THE SENATE.

A Washington dispatch says that Senator Hanna, who is very much interested in the isthmian canal question, feels confident that a canal bill will be passed before the close of the present session of congress and that it will be on the lines of what is known as the Spooner amendment. The Spooner amendment is first of all a Panama canal bill. It authorizes the president, however, to use his discretion in the selection of routes in case it should be found that a clear title cannot be obtained to the Panama route. Senator Hanna will lead the fight for the substitution of the Panama route in place of the Nicaragua provision carried in the bill upon which discussion began Wednesday in the senate. This bill, reported favorably by a majority of the senate committee, is identical with the Hepburn bill, which was hurried through the house early in the session. It represents the views and ambitions of the venerable Senator Morgan of Alabama, who delivered a carefully-prepared address on the bill in the senate Wednesday. It is not probable that the present debate on the bill in the senate will be of long duration. A vote is expected within two weeks.

The extraordinary development of the coal trade in Japan and the dispatch steamers have met with in this respect have been phenomenal. The output during the year 1901 was 4,712,644 tons. The dispatch, considering the methods employed in loading, the actual passage from hand to hand of bags containing the coal, is extraordinary. The steamship Obi was loaded with 4,536 tons of coal in twenty-two hours; the steamer Crusader was loaded with 7,190 tons of coal in forty-four hours; the Tsurugisan Maru with 5,300 tons of coal in thirty-three hours; the Ailsa Craig with 5,055 tons of coal in twenty-eight hours. The work is done mainly by women, who form a human chain from the lighter to the hold of the steamship, and who work with incredible rapidity.

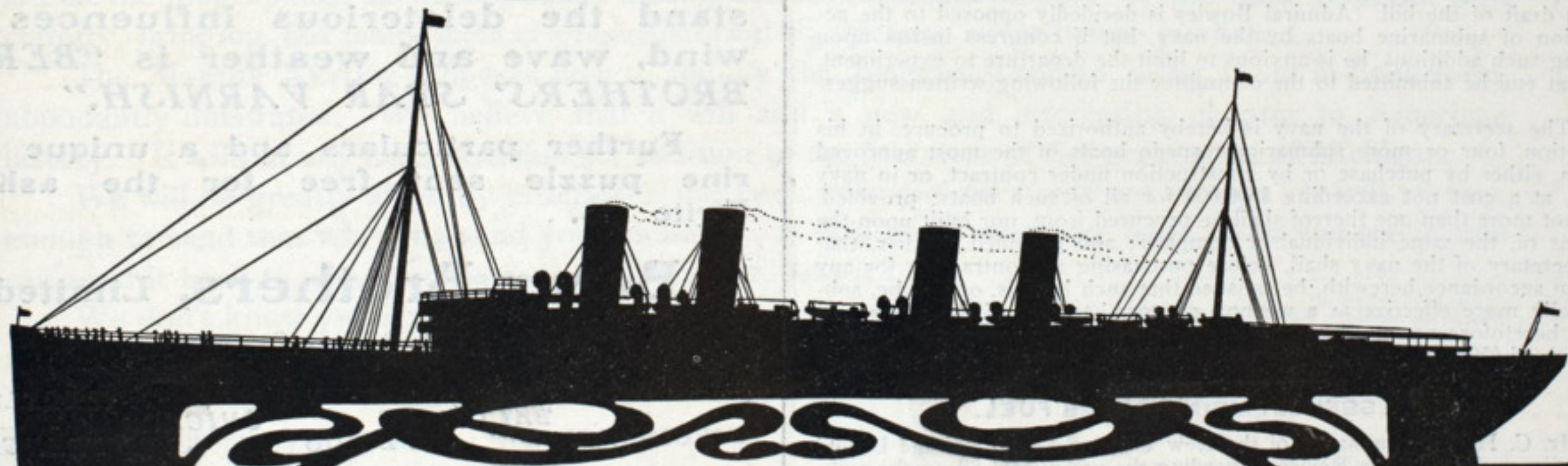
A dispatch from Berlin says that Herr Krupp, famous German maker of guns and armor, has brought to perfection a gun, the projectile from which is capable of penetrating the best and thickest armor plate he manufactures. Emperor William witnessed trials of the gun and is said to have exacted a promise from Herr Krupp to reserve it exclusively for the use of the German navy.

Haskins & Sells, certified public accountants of London, New York, Chicago and St. Louis, announce the opening of offices in the Williamson building, Cleveland.

Get navigators' charts from the Marine Review.

## "BENEDICT-NICKEL" for Condenser Tubes

### in CRAFT of all Kinds



#### "BENEDICT-NICKEL"

#### Seamless Condenser Tubes

are highly non-corrosive and are not readily affected by Electrolysis.

Actual tests have demonstrated that they last under conditions where tinned brass tubes are very soon destroyed.

Our treatise, "Electrolysis of Condenser Tubes," gives the full scientific reason for the superiority of "Benedict-Nickel" over copper and brass—send for it.

**BENEDICT & BURNHAM MFG. CO.,**

Factory and Main Office, Waterbury, Conn. New York, 253 Broadway. Boston, 172 High St.

V. Waring, N.Y.



### VALUE OF SUBMARINE BOATS.

One of the questions now agitating the navy is the value of the submarine boat as a weapon of war. Nearly all of the chiefs of bureaus are opposed to the purchase at this time of any considerable number of them. Some officers extend the feeling to opposition to any submarine boat of any type. Possibly the fairest statements of the naval expert's view of the new engine of warfare are those made to the house committee on naval affairs—one prepared by Rear Admiral Charles O'Neil, chief of the bureau of naval ordnance, and the other by Rear-Admiral Bowles, chief constructor of the navy. Admiral O'Neil prepared his statement before sailing for Europe and it goes into details far more than that of Admiral Bowles. In it he says:

"I know of no reason for changing the opinion expressed by me before this committee on Jan. 15, 1901, with reference to submarine torpedo boats of the Holland type. I still regard them as experimental crafts, whose utility for efficient service has yet to be demonstrated, and I am fully convinced that the government would not be justified in contracting for any new boats of this type until those now under contract have been completed, accepted, and thoroughly tested, and until the navy department is thoroughly satisfied as to their utility and recommends the building of additional boats of this type. In my opinion, the Holland boat does not fulfill all the necessary requirements of an efficient instrument of warfare. I believe that the science of submarine or sub-surface navigation is yet in its infancy, and that considerable further development must take place before it can with propriety be said to have passed beyond the experimental stage. Apparently the so-called Holland boats have about reached the limit of development to which boats of this type are susceptible, and if we are to progress in the art efforts should be made to produce submarine or sub-surface boats having fewer limitations than the Holland boats, and this can only be done by throwing the door open to other inventors. I think we do not need to do more at present than to give such encouragement as will awaken an interest in the subject, and induce designers and builders to compete with each other in producing the best type of submergible or semi-submergible boat. The possible value of submarine boats in driving off a blockading fleet is frequently referred to, but it should be remembered that the surface torpedo boat has already altered the character of blockading operations, and the submarine boat, on account of its lack of speed and its limited scope of action, is less to be feared than a well-handled torpedo boat of ordinary type. Even if I believed that the boats of the Holland type fulfilled all the necessary requirements, I would not advocate the building of any more of them at this time, as, when all boats now under construction are completed, we shall have fifty-seven torpedo boats of various classes, costing about \$10,000,000, exclusive of guns, mounts, torpedoes and torpedo tubes; and it is a well-known fact that we have not officers or men to place them in commission, and that at present we have no adequate means of taking care of boats already completed, to say nothing of those which are to follow. If we should build thirty additional submarine boats of the Holland type, as is proposed in house bill No. 13,474, we should not know what to do with them, and there is every reason to believe that in a few years they would be practically useless. I would suggest that, in order to give a stimulus to the art, the sum of \$500,000 be appropriated for the express purpose of enabling the secretary of the navy, in his discretion, to contract for or purchase such submarine or sub-surface torpedo boats as in his judgment are best calculated to meet the requirements of the navy, the object of such appropriation being to encourage builders and designers to compete with each other in the further development of such craft."

The statement of Admiral Bowles is of particular interest in that it is embodied in a bill introduced in the house on Wednesday of last week by Representative Capron of Rhode Island; and, indeed, is practically a rough draft of the bill. Admiral Bowles is decidedly opposed to the acquisition of submarine boats by the navy, but if congress insists upon making such additions, he is anxious to limit the departure to experiment. To that end he submitted to the committee the following written suggestion:

"The secretary of the navy is hereby authorized to procure, in his discretion, four or more submarine torpedo boats of the most approved design, either by purchase or by construction under contract, or in navy yards, at a cost not exceeding \$500,000 for all of such boats; provided, that not more than one thereof shall be procured from, nor built upon the designs of, the same individual or company; and provided, further, that the secretary of the navy shall, before purchasing or contracting for any boat in accordance herewith, be satisfied that such boat is, or will be, substantially more effective as a weapon of war than any of the submarine boats heretofore procured or now under construction for the navy; and the sum of \$500,000 is hereby appropriated for this purpose."

### SUCCESSFULLY USING OIL AS FUEL.

Mr. C. H. Ellis, manager of the New Orleans division of the United Fruit Co., writing to the Review regarding the use of fuel oil on the company's steamships, says:

"We are successfully using oil as fuel on our steamship Breakwater, which has made four trips to Central America, and we contemplate converting several more of our steamers during the months of July and August, or as soon as we can spare them from the service. Our experience has been that our saving in the cost of this fuel as compared to coal, including the amount saved in dispensing with firemen, will reach about 50 per cent. We are burning about four barrels of oil to one ton of coal, and the cost of our oil, delivered at steamer's tanks, is 50 cents per barrel. We expect to reduce this quantity by further experiments and will acquire sufficient knowledge before converting our other steamers to make even a greater saving than we are at present."

We don't quite know what it means, but this is what the Mouvement Maritime of Brussels thinks of the Atlantic steamship combination: "In America a Pierpont Morgan is making use of the dangerous and ultra-modern weapon of a trust to build up for the United States the mercantile marine which they have lacked up to now. This brutal, financial, and realistic policy seizes upon and astounds the frogs which croak in the parliamentary swamps and the mute white mice of diplomacy, but, whatever may be the future of it, it attains its end in the present, which is,

of course, the essential thing. The frogs and the white mice are very far from comprehending such up-to-date proceedings, and it is perfectly useless to talk to them on the subject."

The submarine boat Adder, first of her type in the new series, made her initial run last week on a course opposite Mt. Vernon. She went over the course several times, both on the surface and submerged. The longest of the submerged runs was about 1½ miles.

## COMPAGNIE GÉNÉRALE TRANSATLANTIQUE

### FRENCH LINE—UNITED STATES AND EUROPEAN MAIL ROUTE.

New York to Havre-Paris in less than one week.

Steamers sail from New York every Thursday, at 10 a. m.

Company's own vestibuled train from Havre to Paris in four hours.

#### FLEET 70 STEAMERS.

In New York service the following gigantic Twin Screw Steamers:

"LA LORRAINE" (new)	Twin Screw	15,000 tons	22,000 H.P.
"LA SAVOIE" (new)	"	15,000 "	22,000 "
"LA TOURAINE" (modern)	"	10,000 "	12,000 "
"L'AQUITAINE" (modern)	"	10,000 "	16,000 "

Naval officers command above steamers, insuring the same strict discipline as on a man-of-war. These ships all have double bottoms and water-tight compartments, and prescribed routes are taken to avoid fogs. The above steamers contain every modern twentieth century equipment for safety, most luxurious accommodations, and the cuisine is famous. The favorite route of the elite of both continents. For rates, plans and other particulars apply to

EUGENE DE BOCANDE, General Agent for United States and Canada, 32 Broadway, New York.

MAURICE W. KOZMINSKI, General Western Agent, 71 Dearborn St., CHICAGO,

OR TO LOCAL AGENTS.

## Cabins and ..Staterooms

of modern vessels especially those in the passenger service should demonstrate the supreme possibilities of the wood finisher's art.

This demands a special varnish however, as atmospheric conditions are more destructive to varnish afloat than ashore and the ordinary article is of but little use.

The varnish best adapted to withstand the deleterious influences of wind, wave and weather is "BERRY BROTHERS' SPAR VARNISH."

Further particulars and a unique marine puzzle sent free for the asking. Write us.

### Berry Brothers, Limited

Varnish Manufacturers

NEW YORK BOSTON PHILADELPHIA  
BALTIMORE CHICAGO  
CINCINNATI ST. LOUIS SAN FRANCISCO

Factory and Main Office, DETROIT

## "Seaboard Steel Castings."

MANUFACTURERS OF  
"THE ADMIRAL" ANCHOR.

THE LATEST AND BEST  
STOCKLESS ANCHOR.

APPROVED BY LLOYD'S.

ANCHORS CAST AND TESTED ON  
ORDER, OR STOCK ORDERS  
PROMPTLY FILLED.

A GUARANTEE OF QUALITY.

OPEN-HEARTH STEEL CASTINGS  
OF THE HIGHEST GRADE.  
FACILITIES FOR CASTINGS UP TO  
80,000 POUNDS WEIGHT.

MACHINE WORK AND PATTERNS  
FURNISHED WHEN REQUIRED.

RAIL OR WATER DELIVERIES.

CAPACITY, 1500 TONS PER MONTH

Seaboard Steel Casting Co.,

CHESTER, PA.



# A HISTORY OF THE LAKE SUPERIOR IRON COUNTRY

THE MARINE REVIEW RECENTLY PUBLISHED A BIOGRAPHY OF THE HON. PETER WHITE, OF MARQUETTE, MICH., WHICH ATTRACTED WIDESPREAD ATTENTION THROUGHOUT THE COUNTRY, AND RESULTED IN A QUICK SALE OF THE ENTIRE ISSUES IN WHICH IT WAS PUBLISHED. ❀ ❀ ❀ ❀

There were two reasons for this: The first was that the personality of the HON. PETER WHITE is fascinating and that it has been given to very few men to live the life which he has lived. He went into the upper Peninsula of Michigan almost immediately upon the discovery of iron ore, and, as a slender stripling, assisted in the exploitation of the first iron mine. He penetrated the trackless wilds with Indians and dog sleds to fetch and carry the mails and in an hundred ways he sought to develop this wonderful iron country. His life is *romance*; it is high light against the background of the greatest industrial revolution that the world has ever seen. It is these great deposits of iron in the Lake Superior country which have made the United States the great manufacturing nation that it is. They have literally moved the world's steel-making center west of the Allegheny mountains. Peter White's manly, sturdy life has continually been a part of this procession of progress. This is the first and great reason for the avidity with which the biography was seized upon. The second reason is that the biographical sketch contained a complete and authentic history of the Lake Superior iron country, bringing out many facts of great historical significance never before published.

The MARINE REVIEW proposes now to amplify the biography and to bring it out in book form, abundantly illustrated. We believe that it will add a new and interesting chapter to American history. It will, at any rate, be a distinct addition to the literature of the great state of Michigan.

We will be greatly aided by orders for the book now, *but don't send any money*. It will be time enough to send that when we send you the book. If you don't want the book when you see it, you can send it back to us at our expense. That's fair, isn't it?

We don't know yet what the book is going to cost us; but it won't cost you over *One Dollar* anyhow, and probably not more than *Fifty Cents*.

May we have your order? We would like it now because it will enable us to determine, in a measure, how many to print.

A postal card will serve you for an order.

---

## Marine Review Publishing Co.

39-40-41 WADE BUILDING

CLEVELAND, O.



A number of very complete outfits of driving machinery and boat equipment, accompanied by plans and specifications for building the hull and installing the machinery, have been sent out by the Marine Iron Works, station A, Chicago. Several similar contracts now under way. This is a plan that they have demonstrated to be an exceptionally good one, particularly for those located at a distance where they may have suitable material and good men to do the work, provided they secured the necessary information with plans and details, all of which the Marine Iron Works furnish with their complete machinery outfits when so contracted for.

Get photographs of ships, docks, etc., from the Marine Review, Cleveland, Wade bldg.

### Passenger Steamer Wanted.

WANTED—A fast side or stern-wheel steamer of the following dimensions: Length, 200 ft.; beam, not over 42 ft. if a side-wheel boat; draught of water, light, 8½ ft.; average speed, 16 or 18 miles an hour; must have at least seventy-five state rooms, with all fittings, and well furnished. Send full particulars, with consumption of fuel per hour, price, age of hull and boilers, and where built. T. M. Kirkwood, 165 Lowther avenue, Toronto, Ontario.

3

### Steamer I. M. Weston For Sale.

Length, 96.5 ft.; breadth, 18 ft.; depth, 7.6 ft.; 95 tons. In first-class condition. E. J. Glackin, 363 So. Morgan street, Chicago. tf

### Lake Steamer Wanted.

WANTED—A lake steamer of say 140 to 180 ft. length, 28 to 35 ft. beam, 12 to 16 ft. depth, with compound condensing engines. In case you have such a boat for sale, please give full particulars, cash price, time and place of delivery, etc. Address 120 Fifth avenue, Duluth, Minn. tf

### Vessel Property Wanted.

Wanted—Vessel property to be paid for in Chicago real estate at cash prices. Will take sailing vessel, barge or steamer. Might put in part cash. Address, giving full particulars. W. T. Farwell, Room 211 Oxford Bldg., Chicago. June 5

### Steam Yacht for Sale.

Steam yacht, 35 ft. over all, 7 ft. beam; burns kerosene; has electric light; is in first-class order. J. L. Alberger & Son, Ellicott Square, Buffalo, N. Y. June 26



No. 66 E.

## CRANE EXTRA HEAVY BRASS VALVES

GLOBE, ANGLE, GATE, CHECK, ETC., PATTERNS

FOR STEAM PRESSURES UP TO 250 LBS.

TESTED TO 800 LBS. HYDRAULIC

THESE VALVES ARE EXTRA HEAVY IN ALL PARTS AND ARE ESPECIALLY DESIGNED FOR EXTREMELY HIGH PRESSURE WORK, WHERE PERFECT RELIABILITY IS REQUIRED. MAY BE PACKED WHEN VALVE IS OPEN AND STEAM IS ON

WRITE FOR CATALOGUE

# CRANE CO.

CHICAGO

ESTABLISHED 1855

NEW YORK  
PHILADELPHIA  
CINCINNATI  
KANSAS CITY  
SIOUX CITY  
DULUTH  
OMAHA

ST. PAUL  
ST. LOUIS  
SEATTLE  
MINNEAPOLIS  
LOS ANGELES  
SAN FRANCISCO  
SALT LAKE CITY  
PORTLAND, ORE.

# BELLEVILLE GENERATORS

Grand Prix 1889

Originated 1849

Hors Concours 1900

Latest Patents 1902

Number of Nautical Miles made each year by Steamships of the Messageries Maritimes Co., Provided with Belleville Generators—Since their Adoption in the Service.

Year.	Australien	Polynésien	Armand Béhic	Ville de la Ciotat	Ernest Simons	Chili	Cordillère	Laos	Indus	Tonkin	Annam	Atlantique
1890.....	67,728	2,460										
1891.....	68,247	68,331	204									
1892.....	68,247	68,403	69,822	23,259								
1893.....	68,379	68,343	68,286	68,247								
1894.....	68,439	68,367	68,574	68,439	37,701							
1895.....	68,673	68,766	68,739	68,808	40,887	28,713						
1896.....	69,534	92,718	69,696	69,549	62,205	63,153	40,716					
1897.....	68,250	69,606	92,736	69,555	62,235	76,110	63,357	43,146				
1898.....	70,938	69,534	69,552	69,597	62,526	63,240	63,240	62,553	63,954	22,707		
1899.....	69,534	69,615	67,431	90,405	60,246	62,778	62,868	52,344	54,855	44,007	22,884	
1900.....	69,534	67,494	69,744	69,564	61,719	62,382	62,502	51,471	53,373	62,016	63,066	52,140
1901.....	44,220	69,627	69,594	66,948	51,057	62,460	62,490	61,743	62,688	43,866	62,466	63,126
Total.....	801,723	783,264	714,378	664,371	438,576	418,836	355,173	271,257	234,870	172,596	148,416	115,266

ATELIERS ET CHANTIERS DE L'ERMITAGE, À ST. DENIS (SEINE), FRANCE.

WORKS AND YARDS OF L'ERMITAGE AT ST. DENIS (SEINE), FRANCE.

TELEGRAPHIC ADDRESS: BELLEVILLE, SAINT-DENIS-SUR-SEINE.